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POST-SERVICE EARNINGS OF VETERANS: A SURVEY AND FURTHER RESEARCH

by

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Post-Service Earnings of Veterans: A Survey and Further Research

by

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Submitted in partial fulfillment
of the requirements for the degree of

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from the

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ABSTRACT

This thesis analyzes the post-service labor market experience of military veterans. First, an exhaustive survey of the literature on the post-service earnings was conducted. Research studies were classified according to survey sample, methodology and empirical findings. Second, an empirical analysis of the effect of veteran status on post-service earnings was performed. A dataset was created using the 1986 Reserve Components Survey. Standard human capital models were estimated to measure the effect of (1) veteran status, (2) formal military training (3) military on-the-job training, and 95) civilian-reserve job similarity. The results indicate a small overall negative return to veteran status. However, results for the individual services varied. A positive return was found for service in the Air Force, Navy and Marine Corps, but a penalty was observed for service in the Army. It appears that black veterans were not hurt by military service. The results for training and transfer variables were positive for the Air Force, Navy and Marine Corps.

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I. INTRODUCTION

A. THE RESEARCH QUESTION

This thesis addresses the issue of how military veterans fare in the civilian labor market after completion of military service. The post-service earnings experience of veterans are compared with that of comparable civilians with no prior service to determine whether military service affects any observed earnings differences. Also of concern is whether post-service earnings differences depend on the branch of service and the type of training received. Finally, differences between black and white veterans are examined. In addition to the empirical analysis, this thesis contains an exhaustive survey of the literature available on the post-service earnings of military veterans. Previous studies and research are classified by source of data, empirical methodology, survey sample and empirical findings.

1. Why Should We be Concerned?

The importance of manpower issues to the Department of Defense cannot be overstated. The military services must maintain the highest possible level of operational readiness. Our nation's armed forces must be able to respond to world events and protect our national interests even in peacetime. A recent example of a peacetime crisis is the invasion of

Kuwait by Iraq in August of 1990. A substantial number of forces were called upon to respond to this crisis and were required to stay on station for an extended period of time.

Each of the military services has been summoned in response to critical world events a number of times since World War II. Using the Navy as an example, a 1978 Brookings Institute study found that naval forces were involved in 177 of the 215 incidents promoting U. S. political objectives from World War II to 1975 (U. S. Congress Budget Report, 1982). The Navy currently has fleets on three oceans, the Mediterranean Sea and the Persian Gulf and is part of extensive drug interdiction operations in the Caribbean.

Recent congressional debates have focused on the possibility of reducing the number of military personnel. If the military services are to become smaller the need for high quality personnel will increase in order to respond effectively to crisis situations and maintain a strong national defense. The declining population of youth may have a negative impact on the military services' ability to recruit the requisite number of qualified personnel. The youth population has been declining and is not expected to reach its lowest point until the mid 1990's. Although it is expected to increase again until the year 2010, this increase in population size will not be as large as it was in the early 1980's (Daymont and Andrasani, 1986).

In this era of the all volunteer force, the decline in available youth will result in the military encountering even stronger competition for the young men and women who are qualified to serve.[1] Since the military services will be competing with industry and educational institutions for a shrinking labor supply, the value of military service and its impact on a veteran's earnings potential in the civilian sector becomes extremely important. A potential enlistee's decision to join the military rather than take advantage of other employment or educational opportunities is likely to depend on his perception of the degree to which each choice may enhance his subsequent earnings capabilities. It seems that young people entering the military today view military service as an investment in human capital to a greater extent than they did in the past. As a result, the armed forces' advertising programs have focused primarily on the training and skills they can offer a prospective enlistee.

In the future, as the military faces a diminishing labor supply and tighter budget constraints, the need for efficient use of available recruiting resources will also become increasingly acute. Determining what effect military service has on the post-service earnings of veterans, and what factors contribute to this effect, will assist the Department

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[1] The qualified segment of youth does not include those who are institutionalized, expected to enter college and complete at least two years, or have not met current mental, physical, or moral standards.

of Defense in setting manpower policies and will also assist Congress in making pay and compensation package decisions.

2. Scope of this Research

This thesis consists of two parts. The first part is a review of prior research studies. Each study is classified according to the source of the data, empirical methodology, survey sample and empirical findings. The second section reports the empirical results on the impact of military service on post-service civilian earnings in the era of the All-Volunteer Force.

II. LITERATURE REVIEW

A. WHAT DO WE KNOW SO FAR?

A considerable amount of research has been conducted on the post-service earnings of veterans. The majority of the literature focuses on the Vietnam era but World War II, the Korean war and the all-volunteer force eras have been studied as well. The literature investigates different aspects of human capital theory with respect to investments in human capital and their subsequent influence on the earnings ability of veterans entering the civilian sector. Although human capital theory is generally used to evaluate the returns to education and training, much consideration has also been given to how the choice of military occupational specialty affects earnings potential in similar civilian occupations. Earnings differentials with respect to race were explored as well.

Most studies concluded that overall, veterans earn more than otherwise comparable non-veterans, but the era in which the veteran served made a difference. Of the three war eras, World War II veterans were found to fare best, followed by the Korean War veterans, with Vietnam veterans obtaining the least benefit from military service.

Veterans of World War II and the Korean conflict received an earnings advantage of three to twelve percent (Berger and

Hirsch, 1983). Martindale and Poston found that black veterans of all war eras earned more than their civilian counterparts while white Vietnam veterans earned less. A consistent finding across all war eras is that the profitability of military service declines as the education level of the veteran increases. Berger and Hirsch (1983) and Rosen and Taubman (1982) found positive returns to education only for veterans with less than twelve years of school.

B. WORLD WAR II

Although most studies of the World War II era conclude that World War II veterans receive an earnings premium (Villamez and Kasarda, 1976; Rosen and Taubman, 1982; Martindale and Poston, 1979; Little and Fredland, 1979), agreement on this finding is not universal. Angrist and Krueger (1989) found that World War II veterans earned less than non-veterans. Fredland and Little (1980) observed that veterans could earn more than non-veterans if their training, whether acquired through the military or through a civilian source, was in the field of their occupation of choice and that non-white veterans showed larger benefits than white veterans.

C. VIETNAM WAR

The Vietnam War era literature is the most disparate in terms of the value of military service for the veteran. This

is not surprising considering the unique nature of the Vietnam-era. The Vietnam veteran returned home to an ambivalent nation, a much different situation than that faced by his World War II or Korean War counterparts. Also, the military demobilization at the end of the war coincided with a general economic slowdown. Finally, the birth cohorts of the Vietnam veterans were considerably larger than those of previous war eras. Given these circumstances it would be natural to expect Vietnam veterans to face difficulties with maximizing earnings potential in the civilian workplace, yet a number of studies found that Vietnam veterans earned more than non-veterans (DeTray, 1980; Goldberg and Warner, 1986; Hess, 1980; Higgins, 1984; Reams, 1983). Others indicated that veterans' earnings were approximately equal to non-veterans (Berger and Hirsch, 1983; Cohany, 1987, Jackson, 1986; Reams, 1983; Soyak, 1987) and the results of other studies point to veterans earning less than non-veterans (Angrist, 1990; Angrist and Krueger, 1989; Schwartz, 1986; Villamez and Kasarda, 1976; Rosen and Taubman, 1986).

The Vietnam-era research suggests other conclusions as well: (1) White veterans were found to earn more than non-white veterans (Goldberg and Warner, 1987; Jackson, 1986); (2) Veterans in white collar professions earn more than veterans in blue collar positions (Goldberg and Warner, 1987); (3) Veteran status is useful as a screening device for employment for non-whites and those with less education (DeTray, 1980);

(4) Earnings potential differs by length of service (Higgins, 1984); (5) Earnings growth rates of veterans are greater than non-veterans (Hirschkowitz, 1988; Berger and Hirsch, 1983); (6) Return to education was much lower for veterans than for non-veterans (Schwartz, 1986); and (7) The amount of training (military or civilian) and pre-service experience in veterans' current occupational specialty increases earnings (Norrblom 1976). Finally, Angrist and Krueger, (1989) in their cross-sectional comparisons assert that, on average, Vietnam veterans experience more unemployment than comparable non-veterans.

D. ALL-VOLUNTEER FORCE

Conclusions drawn from the All-Volunteer Force (AVF) era generally suggest that veterans' benefits from military service are based on specific factors. Veterans earn less than non-veterans in the early years of their civilian worklife (Bryant and Wilhite, 1990; Daymont and Andrisani, 1986) but have higher earnings growth rates and may catch up to their civilian counterparts within two to three years (Bryant and Wilhite, 1990; Mangum and Ball, 1989). The more highly educated the veteran, the lower his earnings premium (Bryant and Wilhite, 1990; Knapp, 1978). Skill transfer is an important determinant of earnings (Mangum and Ball, 1989), and transferability to civilian sector employment is the main

determinant of the economic value of training (Mangum and Ball 1987, 1986).

E. HUMAN CAPITAL THEORY

Human capital, which can be defined as the present value of an individual's skills, abilities and knowledge, is produced by investments such as formal schooling and on-the-job training. These investments incur costs, including the cost of foregone earnings. Because the military offers formal training and on-the-job experience that may be transferable to the civilian labor market, military service may be considered a form of human capital investment.

The basic human capital model considers education and on-the-job experience to be the prime determinants of earnings. Other individual and job-specific characteristics such as race, socio-economic status, and region of residence may affect earnings ability as well.

1. Transferability of Occupational Skills

The available literature dealing with transferability of occupational skills primarily addresses two issues: first, the extent to which veterans use the skills acquired in the military in subsequent civilian employment and second, the impact of military training on the veterans' civilian earnings potential. Although the degree of transferability indicated by the results of these studies varies based on factors such as the era considered and the skill classifications used,

certain consistent patterns are evident. Mangum and Ball (1989) state that studies which evaluate the opinions of veterans as a research methodology typically find approximately one-half of those surveyed report that military training helped them qualify for a civilian job. Studies employing cross-tabulations of occupational codes indicate that about one-third of the veterans entered civilian occupations related to their military specialty. Mangum and Ball (1989) assert that this difference in results between the two methodologies may reflect the fact that the matching of occupational codes constitutes a stricter measure of skill transfer than do responses to a question concerning the general use of skills acquired in the military. Nevertheless, both types of methodologies provided consistent results, which suggest that skill transfer is more prevalent in the more technical specialties than for those with military-specific training, and generally greater for veterans who served in the Navy and Air Force than for those who served in the Army.

An earlier study by Goldberg and Warner (1987) had similar results. Their *a priori* expectation was that military experience would be a close substitute for civilian experience in the technical specialties in which training appears to be most transferable. They grouped all military occupations into nine categories. For all nine categories, military experience increased potential civilian earnings, but only the training and experience in four technical categories increased the

potential civilian earnings as much as equivalent civilian training and experience. These categories were: Medical, Electrical/Mechanical Equipment Repair, Other Technical and Electronics Equipment Repair. The remaining five categories did increase civilian earnings potential but not to the same degree as equivalent civilian experience. These five categories were Infantry/Combat, Administrative/Clerical, Craftsmen, Service/Supply and Communications/Intelligence.

The military has grown in technical sophistication over the past two decades and it is logical to conclude that the proportion of technical specialties have increased as well. Given that AVF-era individuals have been given a greater opportunity to choose among occupational specialties in the military and that the technical specialties transfer to civilian occupations much more readily than other military specialties, it is likely that the skill transfer between the military and civilian sectors is more prevalent now than in the past. Norrblom (1976) found that an additional year of military training contributed 11.8 percent to post-service earnings if the veteran was employed in an occupation similar to that held while in the service. If there was no match between the military and civilian occupations then there was no impact on earnings capability.

2. Military Service as a Screening Device

Even if military training is not transferable, military service may be seen by civilian employers as evidence of good work qualities. Veteran status may identify the more productive workers and certify that some minimum standards have been met (DeTray, 1982). In this respect veteran status may be viewed as a "screening" device for employers since military service provides the employer with valuable information on worker productivity.

Detray (1982) concentrates on the screening aspect and claims veteran status sends a positive signal to employers indicating relatively high productivity. Berger and Hirsch (1985) point out that veteran status may act as either a positive or a negative screen with the likelihood of each depending on the socio-economic background of the veteran. Schwartz (1986) suggests that employers' perceptions about veterans as a group may exert a positive or negative influence on their willingness to hire a veteran. He argues that the Vietnam veteran can expect substantially less return to education than the Korean veteran because of negative perceptions resulting from the widespread adverse publicity which was accorded to some of the military operations in Vietnam.

The mental and physical exams an individual must pass to be accepted into today's armed services, along with the

of a potentially productive employee. In this sense, military training and experience can be considered a direct substitute for formal schooling. Service in the military may signal some of the same desirable characteristics that are also associated with schooling (Berger and Hirsch, 1983).

General training refers to accumulated skills from education or experience that an individual may apply to any career or job with any other civilian organization. Fredland and Little (1980) hypothesized that military service is largely a form of general training, which should add to a veteran's human capital and therefore to post-service earnings. Their results show a positive impact on income from military service and attest that it is attributable to general training, and possibly to the increased work discipline, and improved communication and quantitative skills developed by the veteran during service.

Specific training is valuable only within the firm or organization that provides the training. Combat arms may be an example of a military occupational specialty in which veterans receive mostly specific training.

3. Bridging

Another aspect of human capital theory includes the view that since military service provides the veteran with a means to increase his productivity and subsequent earnings ability, military service becomes a "bridge" from a lower

socio-economic status to a higher one. "The bridging hypothesis" generally is used to investigate the impact of military service on the earnings potential of minorities and others who may not have had ready access to opportunities to improve their productivity.

Martindale and Poston (1979) stress the role of the military as a bridging environment, particularly for minorities, in creating this premium. Fredland and Little (1980) assert that most of the aspects of the bridging environment used to explain the socio-economic benefits of military service can also be regarded as aspects of general training.

Although there are exceptions, most empirical evidence supports the bridging hypothesis. For example, Martindale and Poston's 1979 study considers the distinctive features of military service pertinent to minorities. They state that job training and education benefits, integration into the living and working environment of the majority group, and the experience of coping with bureaucratic structures are similar to those encountered in the urban civilian labor force. They further state that if the military provides these benefits, then one would expect to find a civilian earnings advantage for minority veterans when compared to minority non-veterans. The goal of their research was to clarify the relationship of military service to post-service socio-economic attainments of different racial groups for separate war cohorts. Their

results support this view although there was variation in the different war eras.

On the other hand, the results from Angrist's 1990 study disagree with this hypothesis since he found that veterans earn less because they have less labor market experience. Angrist asserts that the loss of earnings capability is equivalent to two years of labor market experience.

4. Premium

The productivity screen, bridging, substitutability, and the transferability of training hypotheses are considered components of an earnings advantage that veterans may receive. This advantage resulting from military service is referred to as an earnings premium. Statistical comparisons which control for variables relevant to human capital theory, such as age, education and race, are used to determine if the earnings veterans receive exceed those of comparable non-veterans. Little and Fredland (1979) argue for the existence of such a premium as a consequence of both enhanced productivity and screening. The results of DeTray (1982) support the hypothesis that military service does provide employers with valuable information on worker productivity. He suggests that the specialized training that recruits receive after basic training as well as schooling and training financed through the G.I. bill help explain the veterans' premium.

Angrist and Krueger (1989) suggest that this premium can be amplified or mitigated by political and economic environmental considerations. World War II was widely supported and lead to preferential treatment for veterans in the civilian sector. Also, popular support for the war may have been translated into political support and into relatively generous support for education through relatively generous subsidies as well as preferential treatment in hiring. Vietnam veterans, Angrist and Krueger assert, were discriminated against in the market place because the war had been unpopular.

Other mitigating effects Angrist and Krueger consider in order to isolate the impact on earnings that could be directly attributable to military service deal with the veterans themselves. Seventy-five percent of all eligible men served in World War II. Those who did not serve were either physically or otherwise unfit. During the Vietnam War, in addition to the individuals who did not meet entrance requirements for service, many eligible college educated men managed to avoid service, while lower income individuals were unable to do so. Angrist and Krueger observed that the World War II veteran premium reflects the fact that men with higher earnings potential were likely to have been selected into the armed forces. They concluded that World War II veterans would have earned more than non-veterans even if they did not serve. The conclusion drawn for Vietnam veterans was that there

have earned more than non-veterans even if they did not serve. The conclusion drawn for Vietnam veterans was that there existed a larger disparity in income potential for the lower-income veterans from being out of the civilian labor force for the duration of their service.

F. METHODOLOGICAL ISSUES

The most common technique used by these studies is regression analysis. A description of the data sources, the methodology and the principal findings of the literature reviewed for this thesis is presented in Appendix A. The disparity in the results of the studies reviewed above may be due to differences in data sources, variable definitions, model formulations, estimation techniques, time periods studied, data limitations and whether selectivity bias was controlled. In the more recent studies analysts have explored the implication that data limitations and selectivity bias may have on earlier empirical results.

The comparability of studies is affected by the data that are available. For instance, the data used for investigating the World War II era studied individuals in the workforce many years after separating from the service. In contrast to this, the data available for Vietnam era reflected the incomes of veterans only a few years after separation. Since research has shown that veterans have steeper earnings profiles than non-veterans, it is likely that results of studies of the

from approximately the same number of years after separation for both war eras.

Economic factors can affect results also. Using the Vietnam era as an example, the mid 1970's was a recessionary period. Veterans returning home early in the war would face different job prospects than those returning later. The increase in the aggregate level of education in the United States since World War II could contribute to the variance in post-service earnings ability of veterans from the different war eras. If the average citizen during the Vietnam and All-Volunteer Force eras had a higher education level than during World War II, their earnings ability would also be higher. Thus, one would expect the returns to military service and training for Vietnam and World War II era veterans to be less than for World War II veterans.

Selectivity bias occurs when the observed sample is not representative of the underlying population being considered. Sample selection bias may bias the estimated coefficients in linear regression models. It can be encountered in several ways. Recruits must pass standard tests to enter the military. The recruitment process could be selecting individuals with higher ability levels from the civilian population. And as Cutright (1974) suggests, this may imply different IQ distributions among veterans and non-veterans. Historically, highly trained personnel have low retention rates in the first few years of service because of favorable

civilian employment alternatives. Over time, highly trained individuals will have been "selected out" of the military population (Greenwood and Siegel, no date). Selectivity bias also arises when some veterans choose civilian employment in fields related to their military training while others do not, and in the occupational specialty assignment process where educational background is the basis used to pick the specialty area for a new recruit (Trost et al, 1979; Norrblum, 1976). These examples describe factors that may influence civilian earnings patterns yet have no relationship to influencing patterns from military service. Sample selection must be statistically controlled in order to prevent biases in the results of the analysis.

G. SUMMARY

Human Capital Theory asserts that the level of skill and depth of experience an individual brings to the workplace is influenced by formal schooling or on-the-job training acquired. When an individual elects to participate in an education or training program, he is making an investment. This investment incurs direct costs such as foregone earnings while in school, out-of-pocket expenses such as tuition and books (education), moving expenses (migration) and gasoline (job search). There are indirect costs as well such as "Psychic Losses" which are considered a cost because job search can be tedious and new employment may require migration

which can lead to separation from family and friends. The expected returns from investment in human capital includes a higher level of earnings and greater job satisfaction over one's lifetime.

It has long been acknowledged by economists that education and training are prime determinants of an individual's earnings potential. The results of research investigating how well military training and experience compare to other civilian alternatives varies considerably depending on the methodology employed, the era chosen and the data available. Research studies on the All-Volunteer-Force era show more consistent results than World War II or the Vietnam eras.

Analysis of investment in human capital provides an explanation for wage differentials by age and occupation and can assist with policy decisions regarding how much of the military's resources should be devoted to schooling and training relative to other forms of compensation provided to service members. As long as this country pursues a voluntary versus compulsory military service policy analysis of veterans' earnings will be necessary, a vital link in manpower planning to assure the creation of compensation packages which will attract the requisite quantity and quality of military personnel today and in the future.

III. DATASET, METHODOLOGY AND VARIABLE SELECTION

A. DATASET

The dataset for this study is based on an edited compilation of responses to the 1986 Reserve Component Surveys administered by the Defense Manpower Data Center (DMDC) in coordination with the Deputy Assistant Secretary of Defense (Guard/Reserve Manpower and Personnel). The 1986 Reserve Component Surveys were designed to create a cross-service dataset which could be used to study the impact of personnel policies on service members and their families. The survey included only members of the Selected Reserve who were in active drilling status.

B. METHODOLOGY

The dataset consisted of 60,120 observations from both the officer and enlisted communities of guard and reserve units of the Army, Air Force, Navy, Marine Corps and Coast Guard. Two samples were created from the dataset, one used to estimate models based on annual income and the other based on weekly earnings. The survey question for weekly earnings was specific, asking only for the amount earned at the respondent's main civilian job:

> In 1985, what were you USUAL WEEKLY EARNINGS from your (main civilian job or your own business before taxes and other deduction? Give your best estimate.

In 1985, what were you USUAL WEEKLY EARNINGS from your (main civilian job or your own business before taxes and other deduction? Give your best estimate.

The question pertaining to annual earnings specifically asked for all income, not just that from the respondents' main civilian job:

During 1985, what was the TOTAL AMOUNT THAT YOU EARNED FROM ALL CIVILIAN JOBS or your own business BEFORE taxes and other deductions? Include earnings as a Guard/Reserve technician. Include commissions, tips, or bonuses. Give your best estimate.

The sample was restricted to male enlisted employed members of the Air Force, Army, Marine Corps and Navy reservists. The original sample size and the number of observations that were deleted to meet the sample criteria are shown in Table 1 and Table 2 contains the final sample sizes for each of the separate reserve components.

TABLE 1 SAMPLE SIZE REMAINING AFTER RESTRICTIONS: ENTIRE SAMPLE

RESTRICTION	ANNUAL EARNINGS SAMPLE	WEEKLY EARNINGS SAMPLE
No restrictions	60,120	60,120
Coast Guard deleted	57,412	57,412
Officers deleted	46,447	46,447
Women deleted	42,302	42,302
Not employed deleted	34,002	34,002
Income restrictions	32,636	28,927

TABLE 2 FINAL SAMPLE SIZE FOR EACH RESERVE COMPONENT

SERVICE COMPONENTS	ANNUAL EARNINGS SAMPLE	WEEKLY EARNINGS SAMPLE
Air Force Reserve	2,395	2,202
Air Force National Guard	4,715	4,323
Army Reserve	5,914	5,220
Army National Guard	14,553	12,579
Marine Corps Reserve	1,943	1,744
Naval Reserve	2,997	2,762

C. MODEL

A standard human capital earnings equation was estimated using OLS for this analysis. The natural log of either the individual's annual income or weekly earnings was used as the dependent variable so that the coefficients of the independent variables can be interpreted as the percentage change in the income or earnings of the individual given a unit change in the independent variable. The model was specified as follows:

$$\ln(\text{earnings}) = b_1 + b_2 I + b_3 F + b_4 W + b_5 M + u$$

where,

b's = estimated coefficients
I = a vector of income characteristics summarized in Table 3.
F = a vector of family characteristics summarized in Table 3.
W = a vector of work characteristics summarized in Tables 4-5.
M = a vector of military characteristics summarized in Table 3.
u = a random error term that is normally distributed with mean zero and a constant variance.

Table 3 contains the definitions of the variables used in the models and Tables 4 - 5 list the census industry and occupation codes that were included in the models.

Ten model specifications were used to estimate the effect on post-service earnings of: (1) veteran status, (2) race, (3) military formal schooling, (4) military or reserve on-the-job training, and (5) similar military and civilian occupations. These models were applied to both annual and weekly earnings.

Descriptions of the variables used in each model are in Table 6.

The two dependent variables used to measure earnings are self-reported annual income and weekly earnings in 1985. The annual income variable includes earnings from all civilian jobs held during the year. The weekly earnings variable refers to income from the reservist's main civilian job. Annual wage and salary income is a frequently used dependent variable (Fredland and Little, 1980). However, total annual income differs among individuals due to differences in the number of weeks worked and differences in the wage rate. The weekly earnings variable reflects earnings from the main civilian job only and may be expected to correct for some of the inherent differences in income between individuals. Also it is close to the wage rate per unit of time. But in some occupations, weekly earnings is high because workers are likely to be out of work for periods during the year, as in seasonal employment. The two income measures then should be thought of as different rather than one being better than the other.

TABLE 3 VARIABLE DEFINITIONS

MILITARY CHARACTERISTICS

VET	1 if served on active duty 0 otherwise
AFVET	1 if previous active duty in Air Force 0 otherwise
ARMYVET	1 if previous active duty in Army 0 otherwise
MCVET	1 if previous active duty in Marine Corps 0 otherwise
NAVYVET	1 if previous active duty in Navy 0 otherwise
XFRSIM	1 if civilian job similar to guard/reserve duty* 0 otherwise*
AFXFR	1 if Air Force Reserve or National Guard military occupation is similar to civilian job*
ARMYXFR	1 if in Army Reserve or National Guard and military occupation is similar to civilian job*
MCXFR	1 if in Marine Corps Reserve and military occupation is similar to civilian job*
NAVYXFR	1 if in Naval Reserve and military occupation is similar to civilian job* 0 otherwise

INDIVIDUAL CHARACTERISTICS

AGE	Range 16 to 64 years
BLACK	1 if respondent's race is black 0 otherwise
EDUC	years of education completed range sixth grade through 8+ years of college
MARRIED	1 if married 0 otherwise
CHILD	1 if two or more dependents 0 otherwise
EXP	AGE minus EDUC minus six

TRAINING

MILOJT	1 if military on-the-job training 0 otherwise

TABLE 3 (continued) VARIABLE DEFINITIONS

VARIABLE	DEFINITION
AFOJT	1 if received ojt while on active duty in the Air Force 0 otherwise
ARMYOJT	1 if received ojt while on active duty in the Army 0 otherwise
MCOJT	1 if received ojt while on active duty in the Marine Corps 0 otherwise
NAVYOJT	1 if received ojt while on active duty in the Navy 0 otherwise
MILSCH	1 if formal military school 0 otherwise
AFSCH	1 if received formal military education while on active duty in the Air Force 0 otherwise
ARMYSCH	1 if received formal military education while on active duty in the Army
MCSCH	1 if received formal military education while on active duty in the Marine Corps 0 otherwise
NAVYSCH	1 if received formal military education while on active duty in the Navy

WORK CHARACTERISTICS

WORKPTC	1 if working part-time in civilian job 0 otherwise
SELFEMPL	1 if self employed 0 otherwise

INCOME VARIABLES

INCANN	Respondent's annual income (restricted to values greater than zero)
INCWKLY	Respondent's weekly income (restricted to values greater than fifty)

DEPENDENT VARIABLES

LNENGS	Natural logarithm of respondent's annual income
LNWKLY	Natural logarithm of respondent's weekly income

* The 1986 Reserve Components Survey included a question specifically asking if a respondent's civilian job was similar to his or her military occupation.

TABLE 4. CENSUS INDUSTRY CATEGORIES

VARIABLE	INDUSTRIES INCLUDED
AGRIMIN	Agriculture, Forestry, Fisheries, Mining and Construction
MANUFAC	Manufacturing
TRANSP	Transportation, Communication and other Public Utilities
WSALE	Wholesale trade
RETAIL	Retail trade
FINANCE	Finance, Insurance, Real Estate, Business
REPSERV	Repair services
PERSERV	Personal services
PROSERV	Professional services
ENTREC	Entertainment and Recreation
PUBADM	Public Administration

TABLE 5. CENSUS OCCUPATION CATEGORIES

VARIABLE	OCCUPATIONS INCLUDED
MANAGER	Administrative, Managerial and Management related
PROFESS	Professional, Scientific, Specialty, Teachers, Education Administration, Technicians
SALES	Sales
ADMIN	Administrative Support, Clerical excluding Postal
SERVICE	Protective Services, Postal and Food Services
MINEFM	Mine and Farm Workers
CRAFT	Construction Workers, Mechanics and Engineers
OPMACHIN	Precision Production Workers, Machine Operators, Assemblers and Inspectors
OPMOVG	Motor Vehicle Operators, Other Transportation and Material Moving Occupations
OPLABOR	Other Handlers, Helpers and Laborers

TABLE 6: VARIABLES INCLUDED IN MODELS

CONTROL VARIABLES		=	EXP EXP2 MARRIED CHILD EDUC BLACK SELFEMPL WORKPTC AGRIMIN ENTREC FINANCE MANUFAC PERSERV PROSERV PUBADM REPSERV TRANSP WSALE ADMIN CRAFT MANAGER MINEFM OPLABOR OPMACHIN OPMOVG SERVICE
MODELS			
1A and 1W	lnENGS and lnWKLY	=	*f* ([CONTROL VARIABLES], VET) Pooled sample
2A and 2W	lnENGS and lnWKLY	=	*f* ([CONTROL VARIABLES], VET) Black observations only
3A and 3W	lnENGS and lnWKLY	=	*f* ([CONTROL VARIABLES], VET) Non-black observations only
4A and 4W	lnENGS and lnWKLY	=	*f* ([CONTROL VARIABLES], AFVET, ARVET, MCVET, NVET) Veteran observations only
5A and 5W	lnENGS and lnWKLY	=	*f* ([CONTROL VARIABLES], MILOJT) Veteran observations only
6A and 6W	lnENGS and lnWKLY	=	*f* ([CONTROLVARIABLES], AFOJT, ARMYOJT, NAVYOJT) Army used as base case
7A and 7W	lnENGS and lnWKLY	=	*f* ([CONTROL VARIABLES], MILSCH) Veteran observations only
8A and 8B	lnENGS and lnWKLY	=	*f* ([CONTROL VARIABLES], AFSCH, ARMYSCH, NAVYSCH) Army used as base case
9A and 9W	lnENGS and lnWKLY	=	*f* ([CONTROL VARIABLES], XFRSIM) Veteran observations only
10A and 10W	lnENGS and lnWKLY	=	*f* ([CONTROL VARIABLES], AFXFR, MCXFR, NAVYXFR) Army used as base case

IV. DATA ANALYSIS AND EMPIRICAL RESULTS

A. DESCRIPTIVE STATISTICS

1. Overview

Table 7 presents the descriptive statistics for the sample of respondents who reported positive annual income, and the smaller sample that reported weekly earnings above $50. The average annual income in the sample is $23,281 with eighty percent of the respondents working full-time in their civilian jobs. The percentage of individuals working in civilian jobs that are similar to their Reserve or National Guard occupational specialties is 29 percent. This figure closely approximates the results of a study by Mangum and Ball (1989) who indicated that about one-third of the veterans studied entered occupations related to their active duty military specialty.

In this study, veterans are defined as reservists with prior active duty in the regular components. Veterans represent 54 percent of the sample. Respondents are more likely to have received job training from military sources than from civilian sources. Approximately 45 percent of the sample received formal military training whereas 33 percent attended civilian institutions. Similarly, 65 percent of the respondents received military or reserve on-the-job training

TABLE 7 DESCRIPTIVE STATISTICS FOR THE FULL SAMPLE

	ANNUAL EARNINGS N=32,636		WEEKLY EARNINGS N=25,928	
VARIABLE	MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION
INCANN	$23281.35	$15099.82	$23664.20	$15477.29
INCWKLY	$478.17	$414.23	$484.10	$413.51
AGE	34.38	9.42	34.43	9.35
BLACK	0.20	0.40	0.19	0.39
HISP	0.07	0.26	0.07	0.26
EXP	15.40	9.23	15.19	9.23
EDUC	12.98	1.88	13.03	1.86
HSGRAD	0.95	0.22	0.95	0.21
COLLEGE	0.40	0.49	0.41	0.49
MARRIED	0.70	0.46	0.71	0.45
CHILD	0.67	0.47	0.67	0.47
MILSCH	0.45	0.50	0.46	0.50
MILOJT	0.22	0.41	0.22	0.41
RESOJT	0.43	0.50	0.42	0.49
CIVSCH	0.33	0.47	0.07	0.26
CIVOJT	0.15	0.36	0.15	0.36
CORRES	0.32	0.47	0.33	0.47
WORKRES	0.09	0.28	0.09	0.28
WORKFTC	0.80	0.40	0.81	0.39
WORKPTC	0.07	0.26	0.07	0.26
UNEMPL	0.01	0.10	0.01	0.09
SELFEMPL	0.69	0.25	0.07	0.25
FEDGOV	0.18	0.39	0.19	0.39
STATEGOV	0.08	0.27	0.08	0.27
LOCALGOV	0.08	0.27	0.08	0.28
GOV	0.35	0.48	0.35	0.48
PRIFIRM	0.54	0.50	0.55	0.50
AGRIMIN	0.20	0.40	0.18	0.39
ENTREC	0.004	0.06	0.004	0.06
FINANCE	0.02	0.15	0.03	0.15
MANUFAC	0.20	0.40	0.21	0.41
PERSERV	0.05	0.22	0.05	0.22
PUBADM	0.30	0.02	0.32	0.02
PROSERV	0.07	0.25	0.07	0.25
REPSERV	0.008	0.09	0.008	0.09
RETAIL	-0.08	0.27	0.08	0.28
TRANSP	0.10	0.30	0.10	0.30
WSALE	0.03	0.16	0.03	0.17
ADMIN	0.06	0.23	0.06	0.24
CRAFT	0.20	0.40	0.20	0.40
MANAGER	0.10	0.30	0.10	0.30
MINEFM	0.02	0.14	0.02	0.14
OPLABOR	0.06	0.24	0.06	0.24
OPMACHIN	0.14	0.34	0.14	0.35
OPMOVG	0.06	0.24	0.06	0.25
PROFESS	0.14	0.34	0.14	0.35
SALES	0.05	0.23	0.06	0.23
SERVICE	0.14	0.34	0.14	0.35
AFVET	0.10	0.31	0.15	0.36
ARMYVET	0.38	0.49	0.28	0.45
MCVET	0.02	0.16	0.02	0.12
ACTNAVY	0.05	0.21	0.08	0.27
AFRES	0.07	0.26	0.08	0.27

TABLE 7 (CONTINUED) DESCRIPTIVE STATISTICS FOR FULL SAMPLE

	ANNUAL EARNINGS		WEEKLY EARNINGS	
VARIABLE	MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION
AFNG	0.15	0.35	0.15	0.36
ARRES	0.18	0.39	0.08	0.27
ARNG	0.45	0.50	0.15	0.36
MCRES	0.06	0.24	0.06	0.24
NRES	0.09	0.29	0.10	0.29
VET	0.54	0.50	0.54	0.50
XFRSIM	0.29	0.45	0.29	0.45

compared to 15 percent receiving civilian on-the-job training. Almost 63 percent of the sample were in an Army Reserve or National Guard unit, 22 percent were in the Air Force, 9 percent were in the Navy and 6 percent were in the Marine Corps. The distribution of veterans according to their active-duty experience follows a similar pattern. Army respondents constituted 38 percent of all veterans, while Air Force respondents were 10 percent, Navy respondents 7 percent and Marine Corps repondents 2 percent of all veterans.

The average respondent was approximately 35 years old and the mean education level included almost 13 years. Ninety-five percent of the sample were high school graduates and 40 percent attended college. Twenty percent of the sample was black, 70 percent was married and 67 percent had children.

2. Similarities and Differences by Veteran Status

Table 8 calculated a t-test of differences in the means of the characteristics of the veterans and non-veterans. Average annual income of $25,580 exceeds that of non-veterans by $352, or 13 percent. This difference is statistically significant at the one percent level. The average age of the veterans is approximately 38 compared to 30 for non-veterans, a significant difference. In addition to being an older group, average education level of veterans exceeds that of non-veterans. Also, veterans are more likely to have attended

TABLE 8 T-TEST OF DIFFERENCES IN MEANS - ANNUAL EARNINGS: VETERANS VERSUS NON-VETERANS FULL SAMPLE

	VETERANS N=15,103		NON-VETERANS N=17,414		
VARIABLE	MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION	TEST STAT
INCANN	$25358.77	$14725.06	$20630.08	$15092.41	-29.89*
INCWKLY	$513.49	$405.00	$436.62	$421.08	-15.87*
AGE	37.80	8.20	30.42	9.19	-76.46*
BLACK	0.21	0.41	0.19	0.40	-4.66*
HISP	0.07	0.26	0.07	0.26	-1.09
EXP	18.52	8.15	11.78	8.99	-70.55*
EDUC	13.28	1.92	12.63	1.76	-30.91*
HSGRAD	0.97	0.17	0.92	0.27	-19.33*
COLLEGE	0.48	0.50	0.31	0.46	-31.43*
MARRIED	0.78	0.41	0.60	0.49	-36.15*
CHILD	0.75	0.43	0.57	0.49	-34.26*
MILSCH	0.48	0.43	0.43	0.49	9.77*
MILOJT	0.29	0.45	0.13	0.34	-35.25*
RESOJT	0.41	0.49	0.48	0.49	5.74*
CIVSCH	0.08	0.28	0.05	0.22	-11.07*
CIVOJT	0.17	0.38	0.13	0.38	-10.32*
CORRESP	0.37	0.48	0.27	0.44	-20.30*
WORKRES	0.10	0.29	0.07	0.26	-7.05*
WORKFTC	0.81	0.39	0.79	0.41	-3.59*
WORKPTC	0.06	0.24	0.09	0.28	9.84*
UNEMPL	0.01	0.09	0.01	0.10	1.71
SELFEMPL	0.07	0.25	0.07	0.26	2.11**
FEDGOV	0.24	0.43	0.12	0.32	-27.84*
STATEGOV	0.09	0.28	0.08	0.26	-4.83*
LOCALGOV	0.09	0.29	0.07	0.25	-8.50*
GOV	0.42	0.49	0.26	0.43	-30.43*
PRIFIRM	0.49	0.50	0.59	0.49	18.83*
AGRIMIN	0.17	0.37	0.25	0.43	18.40*
ENTREC	0.003	0.06	0.01	0.07	2.91**
FINANCE	0.01	0.15	0.02	0.15	2.96**
MANUFAC	0.20	0.40	0.20	0.40	0.74
PERSERV	0.05	0.21	0.06	0.24	4.46*
PROSERV	0.08	0.26	0.06	0.23	-6.44*
PUBADM	0.28	0.45	0.17	0.37	-24.30*
REPSERV	0.01	0.08	0.01	0.10	5.67*
RETAIL	0.05	0.22	0.11	0.32	19.20*
TRANSP	0.12	0.32	0.07	0.27	-12.78*
WSALE	0.02	0.15	0.03	0.18	5.22

* Significant at the 0.01 Level
** Significant at the 0.05 Level
*** Significant at the 0.10 Level

TABLE 8 (Continued) T-TEST OF DIFFERENCES IN MEANS
ANNUAL EARNINGS: VETERANS VERSUS NON-VETERANS
FULL SAMPLE

	VETERANS		NON-VETERANS		
VARIABLE	MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION	TEST STAT
ADMIN	0.06	0.24	0.05	0.22	-3.59*
CRAFT	0.19	0.40	0.20	0.40	1.74***
MANAGER	0.11	0.31	0.09	0.29	-5.19*
MINEFM	0.01	0.11	0.03	0.17	11.02*
OPLABOR	0.05	0.21	0.06	0.26	10.54*
OPMACHIN	0.13	0.34	0.15	0.35	4.24*
OPMOVG	0.06	0.24	0.07	0.25	2.86**
PROFESS	0.17	0.37	0.10	0.31	-16.18*
SALES	0.04	0.20	0.07	0.25	8.28*
SERVICE	0.15	0.35	0.12	0.33	-5.31*
AFRES	0.11	0.31	0.04	0.19	-24.42*
AFNG	0.16	0.37	0.13	0.34	-8.25*
ARRES	0.21	0.40	0.15	0.36	-12.33*
ARNG	0.36	0.48	0.55	0.50	36.59*
MCRES	0.03	0.18	0.09	0.29	22.43*
NRES	0.14	0.35	0.04	0.19	-32.09*
XFRSIM	0.31	0.46	0.27	0.44	-8.09*

* Significant at the 0.01 Level
** Significant at the 0.05 Level
*** Significant at the 0.10 Level

college. The racial composition of the two groups is similar. Married veterans outnumber non-veterans by 18 percentage points, and veterans have a higher proportion of children than non-veterans. Finally, veterans were significantly more likely to be employed in the government sector than non-veterans.

3. Similarities and Differences by Race

The descriptive statistics for the black and non-black samples are presented in Table 9. The average annual income of blacks is less than that of non-blacks by $2,699 or 11 percent. The education level, college attendance rates and high school graduate percentage are very similar between blacks and non-blacks. This is consistent with prior expectations because of the educational screening required for military service.

The number of blacks with children is very similar to non-blacks, yet fewer blacks were married (61 percent) than non-blacks (72 percent). Blacks were almost three years younger than non-blacks. A higher proportion of blacks work full-time at their civilian job (82 percent) than non-blacks (79 percent). Similarly more blacks are veterans (56 percent) than non-veterans (53 percent).

4. Weekly Earnings Sample Descriptive Statistics

Tables 10 and 11 present descriptive statistics for the sample of respondent with accurate information on weekly

TABLE 9 T-TEST OF DIFFERENCES IN MEANS - ANNUAL EARNINGS: BLACK VERSUS NON-BLACK FULL SAMPLE

	BLACK N=6,662		NON-BLACK N=25,855		
VARIABLE	MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION	TEST STAT
INCANN	$21135.91	$15876.18	$23834.16	$14843.38	13.04*
INCWKLY	$476.83	$504.84	$478.49	$389.61	0.27
AGE	32.06	8.35	34.97	9.58	22.69*
HISP	0.19	0.30	0.04	0.21	-40.90*
EDUC	12.87	1.82	13.01	1.89	5.39*
HSGRAD	0.94	0.24	0.95	0.22	4.54*
COLLEGE	0.37	0.48	0.40	0.49	4.43*
MARRIED	0.61	0.49	0.72	0.45	18.53*
CHILD	0.69	0.46	0.66	0.47	-4.38*
EXP	1.19	8.10	15.96	9.41	22.00*
MILSCH	0.45	0.50	0.45	0.50	0.78
MILOJT	0.23	0.42	0.21	0.41	-3.54*
RESOJT	0.52	0.50	0.40	0.49	-17.44*
CIVSCH	0.05	0.22	0.07	0.26	6.51*
CIVOJT	0.12	0.33	0.16	0.30	7.34*
CORRESP	0.22	0.41	0.35	0.47	21.00*
WORKRES	0.04	0.18	0.10	0.30	16.50*
WORKFTC	0.82	0.38	0.79	0.40	-5.06*
WORKPTC	0.09	0.29	0.07	0.25	-5.92*
UNEMPL	0.12	0.33	0.16	0.30	7.35*
SELFEMPL	0.04	0.20	0.08	0.27	10.66*
FEDGOV	0.18	0.39	0.18	0.39	-6.80*
STATEGOV	0.11	0.31	0.07	0.26	-9.19*
LOCALGOV	0.09	0.29	0.08	0.27	-2.79**
GOV	0.38	0.49	0.34	0.47	-6.80*
PRIFIRM	0.50	0.50	0.55	0.50	7.11*
AGRIMIN	0.24	0.43	0.19	0.40	-8.97*
ENTREC	0.004	0.06	0.004	0.06	-0.12
FINANCE	0.02	0.13	0.03	0.16	4.04*
MANUFAC	0.18	0.38	0.21	0.40	4.04*
PERSERV	0.01	0.11	0.01	0.09	3.30*
PROSERV	0.07	0.26	0.07	0.25	-2.19**
PUBADM	0.22	0.41	0.24	0.42	3.46*
REPSERV	0.05	0.23	0.05	0.22	-1.11***
RETAIL	0.07	0.26	0.08	0.28	3.53*
TRANSP	0.11	0.31	0.10	0.30	-2.72**
WSALE	0.02	0.14	0.03	0.17	3.89*

* Significant at the 0.01 Level
** Significant at the 0.05 Level
*** Significant at the 0.10 Level

TABLE 9 (CONTINUED) T-TEST OF DIFFERENCES IN MEANS - ANNUAL EARNINGS: BLACK VERSUS NON-BLACK FULL SAMPLE

	VETERANS N=6,662		NON-VETERANS N=25,855		
VARIABLE	MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION	TEST STAT
ADMIN	0.07	0.26	0.05	0.23	-5.87*
CRAFT	80.15	0.36	0.21	0.41	11.11*
MANAGER	0.07	0.26	0.11	0.31	8.60*
MINEFM	0.01	0.10	0.02	0.14	5.58*
OPLABOR	0.08	0.27	0.06	0.23	-6.86*
OPMACHIN	0.14	0.35	0.14	0.34	-0.75
OPMOVG	0.07	0.27	0.06	0.27	-4.57*
PROFESS	0.10	0.31	0.15	0.35	8.96*
SALES	0.04	0.19	0.06	0.24	7.35*
SERVICE	0.20	0.40	0.12	0.33	-16.02*
AFVET	0.10	0.31	0.15	0.36	10.11*
ARMYVET	0.38	0.49	0.28	0.45	-16.77*
MCVET	0.02	0.16	0.02	0.13	-5.26*
NAVYVET	0.05	0.21	0.08	0.27	9.49*
AFRES	0.26	0.44	0.07	0.26	1.19
AFNG	0.09	0.28	0.16	0.37	14.64*
ARRES	0.26	0.44	0.16	0.37	-18.31*
ARNG	0.45	0.50	0.45	0.50	0.46
MCRES	0.08	0.27	0.06	0.23	-6.96*
NRES	0.06	0.24	0.10	0.30	10.37*
VET	0.56	0.50	0.53	0.50	-4.66*
XFRSIM	0.29	0.45	0.29	0.45	-0.22

* Significant at the 0.01 Level
** Significant at the 0.05 Level
*** Significant at the 0.10 Level

TABLE 10 T-TESTS OF DIFFERENCES IN MEANS - WEEKLY EARNINGS: VETERANS VERSUS NON-VETERANS
FULL SAMPLE

	VETERANS N=15,601		NON-VETERAN N=13,229		
VARIABLE	MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION	TEST STAT
INCANN	$25919.07	$15054.57	$20630.08	$15092.42	-27.21*
INCWKLY	$519.33	$403.71	$436.62	$421.07	-15.77*
AGE	37.83	8.12	30.42	9.12	-72.94*
BLACK	0.20	0.40	0.19	0.40	-5.56*
HISP	0.07	0.26	0.07	0.26	-1.85***
EDUC	13.32	1.91	12.64	1.76	-28.30*
HSGRAD	0.97	0.17	0.92	0.27	-16.89*
COLLEGE	0.49	0.50	0.31	0.46	-29.16*
MARRIED	0.79	0.41	0.60	0.49	-34.10*
CHILD	0.75	0.43	0.57	0.49	-32.25*
MILSCH	0.49	0.50	0.43	0.50	10.15*
MILOJT	0.29	0.45	0.13	0.34	-34.08*
RESOJT	0.41	0.49	0.44	0.50	5.15*
CIVSCH	0.09	0.28	0.05	0.22	10.50*
CIVOJT	0.17	0.38	0.13	0.34	-9.70*
CORRESP	0.38	0.49	0.28	0.45	-19.03*
WORKRES	0.09	0.29	0.07	0.26	-5.99*
WORKFTC	0.82	0.39	0.79	0.41	1.91***
WORKPTC	0.81	0.39	0.82	0.39	9.57*
UNEMPL	0.01	0.09	0.01	0.10	1.14***
SELFEMPL	0.63	0.24	0.07	0.26	1.67***
FEDGOV	0.24	0.43	0.12	0.34	-26.14*
STATEGOV	0.09	0.28	0.07	0.26	-4.88*
LOCALGOV	0.10	0.29	0.07	0.25	-7.73*
GOV	0.42	0.49	0.26	0.44	-28.73*
PRIFIRM	0.50	0.50	0.59	0.49	19.55*
AGRIMIN	0.15	0.35	0.25	0.43	16.46*
ENTREC	0.003	0.06	0.01	0.07	2.93*
FINANCE	0.02	0.16	0.02	0.15	0.36
MANUFAC	0.21	0.40	0.20	0.40	1.28***
PERSERV	0.46	0.20	0.05	0.23	4.43*
PUBADM	0.29	0.45	0.17	0.38	-22.77*
PROSERV	0.08	0.27	0.06	0.23	-5.94*
REPSERV	0.01	0.08	0.01	0.10	-5.39*
RETAIL	0.06	0.22	0.11	0.31	18.92*
TRANSP	0.12	0.32	0.08	0.27	-12.11*
WSALE	0.02	0.15	0.03	0.18	5.45*

* Significant at the 0.01 Level
** Significant at the 0.05 Level
*** Significant at the 0.10 Level

TABLE 10 (CONTINUED) T-TESTS OF DIFFERENCES IN MEANS - WEEKLY EARNINGS: VETERANS AND NON-VETERANS

	VETERANS N=17,414		NON-VETERANS N=15,103		
VARIABLE	MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION	TEST STAT
ADMIN	0.06	0.24	0.05	0.22	-2.96*
CRAFT	0.20	0.40	0.20	0.40	1.96**
MANAGER	0.11	0.31	0.09	0.29	-4.83*
MINEFM	0.01	0.11	0.03	0.17	10.47*
OPLABOR	0.04	0.21	0.08	0.26	9.66*
OPMACHIN	0.13	0.34	0.15	0.35	4.84*
OPMOVG	0.06	0.24	0.07	0.25	2.79**
PROFESS	0.17	0.38	0.10	0.31	-14.79*
SALES	0.04	0.21	0.07	0.25	8.29*
SERVICE	0.15	0.36	0.13	0.33	-5.27*
AFRES	0.11	0.31	0.04	0.19	-23.38*
AFNG	0.16	0.37	0.13	0.34	-7.28*
ARRES	0.20	0.40	0.15	0.36	-10.96*
ARNG	0.30	0.48	0.54	0.50	33.93*
MCRES	0.03	0.18	0.09	0.29	22.08*
NRES	0.14	0.35	0.04	0.20	-30.24*
XFRSIM	0.30	0.46	0.27	0.44	-7.95*

* Significant at the 0.01 Level
** Significant at the 0.05 Level
*** Significant at the 0.10 Level

TABLE 11 (CONTINUED) T-TESTS OF DIFFERENCES IN MEANS - WEEKLY EARNINGS: BLACK VERSUS NON-BLACK
FULL SAMPLE

	BLACK N=5,507		NON-BLACK N=23,323		
VARIABLE	MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION	TEST STAT
ADMIN	0.08	0.26	0.06	0.23	-5.90*
CRAFT	0.16	0.36	0.21	0.41	9.00*
MANAGER	0.08	0.26	0.11	0.31	7.36*
MINEFM	0.01	0.11	0.02	0.14	4.07*
OPLABOR	0.08	0.27	0.06	0.23	-6.03*
OPMACHIN	0.15	0.35	0.14	0.35	-1.76**
OPMOVG	0.08	0.26	0.06	0.24	-3.86*
PROFESS	0.11	0.31	0.15	0.35	7.84*
SALES	0.04	0.19	0.06	0.24	6.52*
SERVICE	0.20	0.40	0.12	0.33	-15.43*
AFVET	0.11	0.32	0.16	0.36	7.71*
ARMYVET	0.38	0.49	0.28	0.45	-15.55*
MCVET	0.02	0.15	0.02	0.12	-4.25*
NAVYVET	0.05	0.22	0.08	0.28	7.97*
AFRES	0.08	0.27	0.08	0.27	-0.30
AFNG	0.10	0.29	0.16	0.40	12.61*
ARRES	0.26	0.44	0.16	0.40	-16.61*
ARNG	0.43	0.49	0.44	0.50	1.75***
MCRES	0.08	0.27	0.06	0.23	-6.34*
NRES	0.06	0.25	0.10	0.30	8.85*
VET	0.57	0.49	0.53	0.56	-5.56*
XFRSIM	0.29	0.45	0.29	0.45	-0.71

* Significant at the 0.01 Level
** Significant at the 0.05 Level
*** Significant at the 0.10 Level

earnings. Separate statistics are presented for the aggregate sample for veterans and non-veterans, and blacks and non-blacks. As indicated in these tables, the profiles for the weekly earnings samples are very similar to those obtained in the annual earnings sample.

B. MULTIVARIATE ANALYSIS

1. Results for Veteran Status

The estimation results for the annual earnings models are presented in Tables 12 through 16. The estimated coefficients that used the dummy variable for veteran status in the pooled sample are presented in Table 12 and indicate that veterans earn 0.3 percent less than non-veterans. This result is inconsistent with the majority of early pre-AVF studies, but seems consistent with more recent studies on the all-volunteer force. These later studies suggest that veterans earn less when they first enter the civilian labor force but have higher earnings growth rates and may catch up to their counterparts within two to three years (Bryant and Wilhite, 1990; Mangum and Ball, 1989; Daymont and Andrasani, 1986). Approximately one-third of the sample had served in the reserves three years or less and half the sample had served six years or less. This high proportion of respondents with relatively few years of labor market experience could weight the results toward lower initial annual earnings.

TABLE 12 REGRESSION RESULTS USING VET
FULL SAMPLE

	MODEL 1A ANNUAL EARNINGS		MODEL 1W WEEKLY EARNINGS	
VARIABLE	COEFF	T RATIO	COEFF	T RATIO
INTERCEPT	8.29	268.23*	4.74	164.67*
BLACK	-0.08	-9.56*	-0.01	-0.87
CHILD	0.05	5.59*	0.05	5.48*
EDUC	0.06	28.27*	0.05	25.12*
EXP	0.05	35.47*	0.04	26.54*
EXP2	-0.001	-22.23*	-0.001	-16.00*
MARRIED	0.11	12.40*	0.06	7.10*
SELFEMPL	0.07	4.94*	0.05	3.88*
WORKPTC	-0.34	-25.49*	-0.21	-17.47*
AGRIMIN	0.13	8.81	0.21	15.50
ENTREC	0.03	0.55	-0.000	0.004
FINANCE	0.23	8.92*	0.27	12.10*
MANUFAC	0.25	16.42*	0.24	18.67*
PERSERV	0.05	1.22	0.10	2.89*
PUBADM	0.28	18.37*	0.29	21.24*
PROSERV	0.06	2.86*	0.10	5.60*
REPSERV	0.04	1.79***	0.07	3.77*
TRANSP	0.39	29.32*	0.40	26.46*
WSALE	0.17	7.90*	0.16	7.31*
ADMIN	-0.06	-2.93**	-0.12	-6.66*
CRAFT	0.01	0.45	-0.17	-1.10
MANAGER	0.07	4.23*	-0.02	-1.14
MINEFM	-0.21	-7.68*	-0.22	-8.24*
OPLABOR	-0.15	-8.37*	-0.19	-10.29*
OPMACHIN	-0.04	-2.73**	-0.10	-6.17*
OPMOVG	-0.10	-5.29*	-0.09	-5.03*
PROFESS	0.08	4.62*	-0.03	-1.84***
SERVICE	-0.08	-3.33*	-0.11	-7.25*
VET	-0.03	-3.78*	-0.02	-2.66*
	N = 32,493		N = 28,813	
	F STATISTIC 457.063		F STATISTIC 307.36	
	R-SQUARE 0.297		R-SQUARE 0.243	
	ADJ R-SQUARE 0.296		ADJ R-SQUARE 0.242	

* Significant at the 0.01 Level
** Significant at the 0.05 Level
*** Significant at the 0.10 Level

Another consideration is that nearly two-thirds of the sample consists of respondents in the Army Reserves or National Guard, and a large proportion of the veterans are also in either the Army Reserves or National Guard. Models which distinguish between the returns to veterans in different services (discussed in detail further on) suggest a negative return for Army veterans. The high percentage of Army veterans in the sample could negatively influence the results. The estimates of the coefficients for the remaining variables support the results of previous research using human capital models.

Earnings for blacks are eight percent lower than for non-blacks. Education has a positive influence on earnings potential. Being married and having children, indicators of a stable, mature employee results in higher earnings by eleven and five percent, respectively. The coefficients of experience and squared experience terms indicate that earnings grow with experience, reach a peak and then decline.

When the sample was split into black and non-black subsets (Table 13), the coefficients for the veteran variable for both groups was negative. However, the veteran status coefficient was negative and significant for non-blacks, but insignificant for blacks. This result suggests that military service is more beneficial for blacks than non-blacks and may provide a bridging environment that facilitates increased civilian earnings potential for blacks. Empirical results of

TABLE 13 REGRESSION RESULTS USING RACE - ANNUAL EARNINGS (DEPENDENT VARIABLE = LNENGS) FULL SAMPLE

	MODEL 2A : BLACK		MODEL 3A : NON-BLACK	
VARIABLE	COEFF	T RATIO	COEFF	T RATIO
INTERCEPT	8.10	95.96*	8.36	257.94*
CHILD	-0.001	-0.02	0.07	6.79*
EDUC	0.06	12.06*	0.06	25.83*
EXP	0.05	11.62*	0.05	34.10*
EXP2	-0.001	-5.83*	-0.001	-21.87*
MARRIED	0.15	6.61*	0.10	10.29*
SELFEMPL	0.03	0.69	0.07	5.31*
WORKPTC	-0.40	-12.10*	-0.32	-22.39*
AGRIMIN	0.61	3.36*	0.13	8.26*
ENTREC	0.08	0.51	-0.02	0.28
FINANCE	0.21	2.66*	0.22	8.91*
MANUFAC	0.23	5.14*	0.26	16.32*
PERSERV	0.14	1.51	-0.07	0.28
PUBADM	0.26	6.08*	0.28	18.02
PROSERV	0.01	-0.13	0.07	3.61*
REPSERV	0.04	0.81	0.03	1.57
TRANSP	0.38	8.07	0.39	22.01*
WSALE	0.17	2.38**	0.17	7.10*
ADMIN	0.02	0.44	-0.07	-3.29**
CRAFT	0.01	0.31	-0.001	-0.54
MANAGER	0.06	1.46	0.07	4.14*
MINEFM	-0.17	-1.83	-0.22	-7.83*
OPLABOR	-0.14	-3.14**	-0.16	-8.02*
OPMACHIN	-0.03	-0.85	-0.05	-2.78*
OPMOVG	-0.12	-2.64*	-0.09	-4.59*
PROFESS	0.10	2.20**	0.07	4.09*
SERVICE	-0.07	-1.78***	-0.09	-5.25*
VET	-0.006	-0.30	-0.03	-4.33*
	N = 6,619		N = 25,815	
	F STATISTIC 65.618		F STATISTIC 411.822	
	R-SQUARE 0.223		R-SQUARE 0.316	
	ADJ R-SQUARE 0.219		ADJ R-SQUARE 0.315	

* Significant at the 0.01 Level
** Significant at the 0.05 Level
*** Significant at the 0.10 level

previous studies (Fredland and Little, 1990; Bryant & Wilhite, 1990; Martindale and Poston, 1979) also confirm this view. Table 14 presents results of estimates of the coefficients for variables representing veteran status in the different services. Compared to being a non-veteran or a veteran of a different branch, Marine Corps veterans receive a 14 percent premium, Navy veterans receive 6 percent, and Air Force veterans receive five percent. Army veterans incur an eight percent penalty for their military experience. All coefficients are significant at the one percent level. T h e positive returns to the non-Army branches may suggest that some of the services have a higher proportion of servicemen in technical specialties. Research findings point to technical skills being more directly transferable to civilian occupations and thus more valuable in terms of post-service earnings ability (Mangum and Ball, 1989,1987,1986; Goldberg and Warner, 1987; Norrblom, 1976). Studies which evaluate the opinions of veterans (Mangum and Ball, 1989) typically find that approximately one-half of the survey respondents report that military training helped them qualify for a civilian job.

The variation in the returns for the different services might imply that the effects of the screening hypothesis may be outweighed by job transferability. The veterans with higher earnings potential may be those in technical specialties or those who have received general training that can be easily transferred to civilian jobs.

TABLE 14 REGRESSION RESULTS USING AFVET ARMYVET MCVET NAVYVET
ANNUAL EARNINGS
SAMPLE RESTRICTED TO VETERANS

	MODEL 4A ANNUAL EARNINGS		MODEL 4W WEEKLY EARNINGS	
VARIABLE	COEFF	T RATIO	COEFF	T RATIO
INTERCEPT	8.30	269.55*	4.74	165.67*
BLACK	-0.07	-8.37*	0.002	0.23
CHILD	0.05	5.99*	0.05	5.89*
EDUC	0.06	27.49*	0.05	25.42*
EXP	0.06	35.96*	0.04	26.97*
EXP2	0.001	-22.60*	-0.001	-16.28*
MARRIED	0.11	12.37*	0.06	7.03*
SELFEMPL	0.07	4.93*	0.05	3.88*
WORKPTC	-0.33	-25.36*	-0.21	-17.30*
AGRIMIN	0.13	9.07*	0.22	15.75*
ENTREC	0.03	0.61	0.001	0.03
FINANCE	0.22	8.90*	0.27	12.13*
MANUFAC	0.25	16.36*	0.26	18.60*
PERSERV	0.04	1.11	0.10	2.77*
PUBADM	0.27	17.70*	0.28	20.51*
PROSERV	0.06	3.31*	0.11	6.09*
REPSERV	0.03	1.71***	0.06	3.67*
TRANSP	0.38	22.33*	0.40	26.09*
WSALE	0.17	7.11*	0.15	7.23*
ADMIN	-0.06	-2.96**	-0.12	-6.62*
CRAFT	0.01	0.51	-0.01	-1.01*
MANAGER	0.07	4.33*	0.02	-1.26
MINEFM	-0.21	-7.48*	-0.21	-8.01*
OPLABOR	-0.14	-7.84*	-0.17	-9.72*
OPMACHIN	-0.04	-2.32**	-0.09	-5.74*
OPMOVG	-0.09	-4.69*	-0.08	-4.61*
PROFESS	0.07	4.19*	0.02	-1.53
SERVICE	-0.08	-4.26*	-0.10	-6.71*
AFVET	0.05	4.27*	0.04	4.46*
ARMYVET	-0.08	-10.76*	-0.08	-9.68*
MCVET	0.14	4.35*	0.11	4.41*
NAVYVET	0.06	4.30*	0.06	5.02*
	N = 32,493		N = 28,813	
	F STATISTIC 453.95		F STATISTIC 307.52	
	R-SQUARE 0.30		R-SQUARE 0.25	
	ADJ R-SQUARE 0.30		ADJ R-SQUARE 0.25	

* Significant at the 0.01 Level
** Significant at the 0.05 Level
*** Significant at the 0.10 Level

The positive effect of education and experience on earnings ability of veterans supports the view that military service provides a useful screen to employers. Once in the military, successful completion of a tour of duty implies higher productivity levels because in order to receive an honorable discharge certain standards of behavior and performance had been met.

2. Models Using Training Variables

Table 15 presents the results of using the annual income models to estimate the effect of military formal schooling and on-the-job training. The Army was used as the base case for both models. The coefficients for the rest of the services are both positive and significant. The substantially higher return for the Air Force and the Navy is as expected since those services have a higher proportion of their personnel in technical specialties (Eitelberg, 1988) and as discussed earlier, technical occupations are more likely to transfer to civilian jobs.

The positive return for the Marine Corps seems indicative again of the military as a screening tool for employers. In the case of the Marine Corps, although their mission as a service is primarily combat oriented, they have developed a reputation for being motivated and disciplined individuals with a high moral character, traits that would be attractive to prospective employers.

TABLE 15 REGRESSION RESULTS USING MILOJT AND AFOJT, MCOJT, NAVYOJT
ANNUAL EARNINGS
SAMPLE RESTRICTED TO VETERANS ONLY

	MODEL 5A		MODEL 6A	
VARIABLE	COEFF	T RATIO	COEFF	T RATIO
INTERCEPT	8.27	187.72	8.23	186.81*
BLACK	-0.07	-5.97*	-0.06	-5.14*
CHILD	0.06	5.29*	0.07	5.65*
EDUC	0.06	21.76	0.06	21.47*
EXP	0.05	22.90*	0.05	23.32*
EXP2	-0.001	15.03*	0.001	15.25*
MARRIED	0.12	10.04*	0.12	10.03*
SELFEMPL	0.02	1.23	0.02	1.14
WORKPTC	-3.30	16.23*	0.30	16.14*
AGRIMIN	0.14	6.57	0.14	6.73
ENTREC	0.02	0.28	0.02	0.27
FINANCE	0.19	5.69*	0.19	5.76
MANUFAC	0.29	12.74*	0.28	12.63
PERSERV	0.46	6.79	0.04	0.75
PROSERV	0.06	2.15**	0.06	2.29**
PUBADM	0.29	13.41*	0.28	13.04*
REPSERV	0.04	1.59	0.04	1.48
TRANS	0.43	18.33	0.42	18.03*
WSALE	0.19	5.48	0.18	5.36*
ADMIN	-0.08	-3.14*	-0.08	-3.13*
CRAFT	-0.02	-1.06	-0.02	-1.03
MANAGER	0.04	1.99**	0.44	1.99
MINEFM	-0.24	5.34*	0.23	-5.19*
OPLABOR	0.20	-7.53*	0.19	-7.10*
OPMACHIN	-0.08	-3.79*	0.08	-3.56*
OPMOVG	-0.16	-6.46*	0.15	-6.02
ROFESS	0.05	2.19**	0.04	1.89**
SERVICE	-0.11	9.94*	-0.10	-9.58*
MILOJT	0.04	4.63	AFOJT 0.01	8.11*
			MCOJT 0.01	3.77*
			NAVYOJT 0.02	7.12*
	N = 17,401		N = 17,401	
	F STATISTIC 187.19		F STATISTIC 180.23	
	R-SQUARE 0.23		R-SQUARE 0.24	
	ADJ R-SQUARE 0.23		ADJ R-SQUARE 0.24	

* Significant at the 0.01 Level
** Significant at the 0.05 Level
*** Significant at the 0.10 Level

Using dummy variables for military on-the-job training produces similar results. The models using the MILOJT and MILSCH dummy variables, which measure the effects for the services collectively, both resulted in positive and significant results as reflected in Table 16. The coefficient for MILOJT indicated a four and one-half percent effect and MILSCH just over a two percent effect. Post-service earnings does appear to be influenced by both military formal schooling and on-the-job training for the veterans as a whole yet training in the Air Force and the Navy seems to have a more direct correlation with the civilian job market.

3. Models Using a Transfer Variable

As discussed earlier, a number of studies have investigated the returns to earnings when a veteran chooses employment in a civilian occupation similar to that of his military specialty and have concluded that he or she will likely receive an earnings premium. A dummy transfer variable to represent the similarity between a veteran's civilian job and his reserve or national guard occupational specialty and the results are presented in Table 17. Model 9A considers veterans as a whole and as indicated by the results, an veterans collectively receive an increase in annual earnings of approximately five percent. Positive returns were evident also in Model 10A in which differences between the services

TABLE 16 REGRESSION RESULTS USING MLSCH AND AFSCH, MCSCH, NAVYSCH
ANNUAL EARNINGS
SAMPLE RESTRICTED TO VETERANS ONLY

	MODEL 7A		MODEL 8A		
VARIABLE	COEF	T RATIO		COEF	T RATIO
INTERCEPT	8.27	187.72		8.23	186.81
BLACK	-0.07	-5.97		-0.06	-5.14
CHILD	0.06	5.29*		0.07	5.65*
EDUC	0.06	21.76		0.06	21.47*
EXP	0.05	22.90*		0.05	23.32*
EXP2	-0.001	15.03*		0.001	15.25*
MARRIED	0.12	10.04*		0.12	10.03*
SELFEMPL	0.02	1.23		0.02	1.14
WORKPTC	-3.30	16.23*		0.30	16.14*
AGRIMIN	0.14	6.57		0.14	6.73
ENTREC	0.02	0.28		0.02	0.27
FINANCE	0.19	5.69*		0.19	5.76
MANUFAC	0.29	12.74*		0.28	12.63
PERSERV	0.46	6.79		0.04	0.75
PROSERV	0.06	2.15**		0.06	2.29**
PUBADM	0.29	13.41*		0.28	13.04*
REPSERV	0.04	1.59		0.04	1.48
TRANS	0.43	18.33		0.42	18.03*
WSALE	0.19	5.48		0.18	5.36*
ADMIN	-0.08	-3.14*		-0.08	-3.13*
CRAFT	-0.02	-1.06		-0.02	-1.03
MANAGER	0.04	1.99**		0.44	1.99
MINEFM	-0.24	5.34*		0.23	-5.19*
OPLABOR	0.20	-7.53*		0.19	-7.10*
OPMACHIN	-0.08	-3.79*		0.08	-3.56*
OPMOVG	-0.16	-6.46*		0.15	-6.02
ROFESS	0.05	2.19**		0.04	1.89**
SERVICE	-0.11	9.94*		-0.10	-9.58*
MILSCH	0.04	4.63	AFSCH	0.01	8.11*
			MCSCH	0.01	3.77*
			NAVYSCH	0.02	7.12*
	N = 17,401			N = 17,401	
	F STATISTIC	187.19		F STATISTIC	180.23
	R-SQUARE	0.23		R-SQUARE	0.24
	ADJ R-SQUARE	0.23		ADJ R-SQUARE	0.24

* Significant at the 0.01 Level
** Significant at the 0.05 Level
*** Significant at the 0.10 Level

TABLE 17 REGRESSION RESULTS USING XFRSIM - ANNUAL EARNINGS FULL SAMPLE

	MODEL 9A XFRSIM		MODEL 10A AFSIM, MCSIM, NAVYSIM	
VARIABLE	COEFF	T RATIO	COEFF	T RATIO
INTERCEPT	8.28	188.56*	4.73	115.04*
BLACK	-0.07	-6.02*	0.01	0.54
CHILD	0.06	5.19*	0.06	5.47*
EDUC	0.06	21.76*	0.05	19.59*
EXP	0.05	22.87*	0.04	16.06*
EXP2	-0.001	-15.06*	10.001	-9.87*
MARRIED	0.12	10.04*	0.07	5.97*
SELFEMPL	0.02	1.16	0.17	0.98
WORKPTC	-0.30	-16.26*	-0.23	-13.12*
AGRIMIN	0.15	6.61*	0.19	9.02*
ENTREC	0.03	0.29	0.05	0.64
FINANCE	0.19	5.79*	0.25	8.24**
MANUFAC	0.29	12.85*	0.26	12.56*
PERSERV	0.05	0.87	0.07	1.41
PROSERV	0.06	2.12**	0.08	3.51*
PUBADM	0.30	13.69*	0.28	14.06*
REPSERV	0.05	1.63	0.02	0.77
TRANSP	0.43	18.46*	0.41	18.99*
WSALE	0.18	5.44*	0.15	4.70*
ADMIN	-0.08	-3.32*	-0.11	-4.60*
CRAFT	-0.03	-1.34	-0.02	-1.08
MANAGER	0.04	1.72***	0.01	0.26
MINEFM	-0.24	-5.40*	-0.24	-5.59*
OPLABOR	-0.20	-7.63*	-0.19	-7.45*
OPMACHIN	-0.09	-3.86*	-0.11	-4.98*
OPMOVG	-0.17	-6.67*	-0.13	-5.06*
PROFESS	-0.11	1.88***	0.01	0.65
SERVICE	-0.11	-5.23*	-0.10	-5.12*
XFRSIM	0.05	4.94*	AFXFR 0.096	5.803*
			MCXFR 0.243	5.946*
			NAVYXFR 0.143	0.017*
	N = 17,401		N = 15,589	
	F STATISTIC	188.060	F STATISTIC	124.23
	R-SQUARE	0.233	R-SQUARE	0.19
	ADJ R-SQUARE	0.231	ADJ R-SQUARE	0.19

* Significant at the 0.01 Level
** Significant at the 0.05 Level
*** Significant at the 0.10 Level

were considered. Navy veterans receive a significantly greater return to earnings than the other services.

4. Weekly Earnings Regression Results

The results of models run using the sample of respondents with valid weekly earnings information are quite similar to those of the annual sample and are presented in Tables 12, 14 and 18 through 21. A few differences are noticeable. For example, in Models 1A and 1W (Table 12) the veteran dummy variable was used with the pooled sample, and the coefficients for the black variable in both models were negative but the black coefficient in the sample using the weekly earnings was larger by six percent. This difference would be expected since the weekly sample contains only earnings from the respondents' main civilian job whereas the annual income variable may include other sources of income as well.

In Models 2A and 2W (Tables 12 and 18), comparing black and non-black samples, being married had a positive significant effect on earnings in both samples, but more so in the annual sample by six percentage points. Having children had a positive significant effect in the weekly sample but a slightly negative and insignificant effect in the annual sample. In Models 3A and 3W (Tables 13 and 18) marriage for non-blacks again has a positive influence in both samples.

TABLE 18 REGRESSION RESULTS USING RACE - WEEKLY EARNINGS
(DEPENDENT VARIABLE = LNWKLY)
FULL SAMPLE

	MODEL 2W : BLACK		MODEL 3W : NON-BLACK	
VARIABLE	COEFF	T RATIO	COEFF	T RATIO
INTERCEPT	4.57	14.03*	4.84	48.69
CHILD	0.02	0.03	0.05	5.78*
EDUC	0.47	0.91	0.05	23.80*
EXP	0.03	9.09*	0.04	25.58*
EXP2	-0.00	8.26*	-0.001	15.65*
MARRIED	0.08	-4.40*	0.05	5.76*
SELFEMPL	0.08	4.11*	0.05	3.54*
WORKPTC	-0.24	1.89***	-0.20	-15.23*
AGRIMIN	0.51	-8.19*	0.11	1.25
ENTREC	0.26	1.62***	-0.09	-0.08
FINANCE	0.56	0.77	0.18	2.10**
MANUFAC	0.56	1.82***	0.17	1.91***
PERSERV	0.42	1.30	-0.01	-0.08
PUBADM	0.36	1.15	0.01	0.12
PROSERV	0.59	1.88***	0.19	2.12**
REPSERV	0.36	1.16	-0.03	-0.32
TRANSP	0.69	2.19**	0.32	3.43*
WSALE	0.44	1.40	0.64	0.69
ADMIN	-0.21	-3.56*	-0.15	-4.54*
CRAFT	-0.11	-2.18**	-0.04	-1.32
MANAGER	-0.12	-2.01**	0.000	0.004
MINEFM	-0.28	-3.12*	-0.25	-6.59*
OPLABOR	-0.27	-4.59*	-0.22	-6.62*
OPMACHIN	-0.19	-3.46*	-0.12	-4.00*
OPMOVG	-0.20	-3.45*	-0.11	-3.52*
PROFESS	-0.07	-1.23	0.001	0.19
SERVICE	-0.18	-3.27*	-0.15	-4.92*
VET	0.01	0.40	-0.02	-3.26*
	N = 5,497		N = 23,315	
	F STATISTIC	41.430	F STATISTIC	282.701
	R-SQUARE	0.180	R-SQUARE	0.260
	ADJ R-SQUARE	0.176	ADJ R-SQUARE	0.259

* Significant at the 0.01 Level
** Significant at the 0.05 Level
*** Significant at the 0.10 level

TABLE 19 REGRESSION RESULTS USING MILOJT AND AFOJT, MCOJT, NAVYOJT ANNUAL EARNINGS SAMPLE RESTRICTED TO VETERANS ONLY

	MODEL 5W		MODEL 6W		
VARIABLE	COEFF	T RATIO		COEFF	T RATIO
INTERCEPT	4.70	113.13		4.68	112.43*
BLACK	0.002	0.22		0.01	0.88
CHILD	0.06	5.48		0.06	5.71*
EDUC	0.05	20.14		0.04	20.00*
EXP	0.04	16.15		0.04	16.21*
EXP2	-0.001	-9.85		-0.001	-9.80*
MARRIED	0.07	6.10		0.07	6.06*
SELFEMPL	0.02	1.10		0.17	1.01
WORKPTC	-0.23	13.06		-0.23	-13.02*
AGRIMIN	0.19	9.04		0.19	9.19*
ENTREC	0.04	0.58		0.04	0.59
FINANCE	0.24	7.96		0.24	7.93*
MANUFAC	0.27	12.73		0.27	12.73*
PERSERV	0.08	1.44		0.07	1.45
PROSERV	0.08	3.48		0.09	3.52*
PUBADM	0.28	13.69		0.27	13.34*
REPSERV	0.24	0.93		0.02	0.87
TRANS	0.42	19.04		0.41	18.98*
WSALE	0.15	4.83		0.15	4.88*
ADMIN	-0.11	-4.31		-0.10	-4.23*
CRAFT	-0.01	-0.72		-0.01	-0.66
MANAGER	0.01	0.67		0.02	0.83
MINEFM	-0.24	-5.50		-0.23	-5.36*
OPLABOR	-0.20	-7.51		-0.19	7.31*
OPMACHIN	-0.11	-4.91		-0.11	-4.78*
OPMOVG	-0.12	-4.98		-0.12	-4.71*
PROFESS	0.03	1.21		0.03	1.18
SERVICE	-0.10	-9.77		-0.10	-4.46*
MILOJT	0.06	6.34	AFOJT	0.12	8.51*
			MCOJT	0.02	4.05*
			NAVYOJT	0.11	7.14*
	N = 15,589			N = 15,589	
	F STATISTIC 129.39			F STATISTIC 124.25	
	R-SQUARE 0.19			R-SQUARE 0.19	
	ADJ R-SQUARE 0.19			ADJ R-SQUARE 0.19	

* Significant at the 0.01 Level
** Significant at the 0.05 Level
*** Significant at the 0.10 Level

TABLE 20 REGRESSION RESULTS USING MILSCH AND AFSCH, MCSCH, NAVYSCH - WEEKLY EARNINGS
SAMPLE RESTRICTED TO VETERANS ONLY

	MODEL 7W		MODEL 8W		
VARIABLE	COEFF	T RATIO		COEFF	T RATIO
INTERCEPT	4.72	113.93		4.69	113.08*
BLACK	-0.000	0.02		0.01	0.76
CHILD	0.06	5.42		0.06	5.74*
EDUC	0.05	19.83		0.05	19.64*
EXP	0.04	16.03		0.04	16.34*
EXP2	-0.001	-9.79		-0.001	9.92*
MARRIED	0.07	6.02		0.07	6.04*
SELFEMPL	0.02	1.06		0.17	0.01
WORKPTC	-0.23	-13.11		-0.23	-13.02*
AGRIMIN	0.19	8.91		0.19	9.03*
ENTREC	0.05	0.65		0.05	0.62
FINANCE	0.24	7.94		0.24	8.00*
MANUFAC	0.26	12.59		0.26	12.48*
PERSERV	0.***	1.41		0.07	1.34
PROSERV	0.08	3.35		0.08	3.47*
PUBADM	0.28	13.71		0.27	13.31*
REPSERV	0.02	0.85		0.02	0.73
TRANS	0.41	18.96		0.41	18.66*
WSALE	0.15	4.79		0.15	7.40*
ADMIN	-0.11	-4.37		-0.10	-4.28*
CRAFT	-0.01	-8.69		-0.01	-0.58
MANAGER	0.01	0.62		0.02	-0.71
MINEFM	-0.24	-5.50		0.23	-5.32*
OPLABOR	-0.20	-7.46		0.18	-7.01*
OPMACHIN	-0.11	-4.90		-0.10	-4.63*
OPMOVG	-0.12	-5.00		-0.11	-4.54*
PROFESS	0.03	1.20		0.02	-1.03
SERVICE	-0.11	-4.61		-0.10	-4.53*
MILSCH	0.02	2.61**	AFSCH	0.10	7.59*
			MCSCH	0.01	4.80*
			NAVYSCH	0.14	7.27*
	N = 15,589			N = 15,589	
	F STATISTIC	127.92		F STATISTIC	123.84
	R-SQUARE	0.19		R-SQUARE	0.19
	ADJ R-SQUARE	0.19		ADJ R-SQUARE	0.19

* Significant at the 0.01 Level
** Significant at the 0.05 Level
*** Significant at the 0.10 LeveL

TABLE 21 REGRESSION RESULTS USING XFRSIM AND AFSIM, MCSIM, NAVYSIM
WEEKLY EARNINGS
SAMPLE RESTRICTED TO VETERANS ONLY

	MODEL 9W		MODEL 10W	
VARIABLE	COEFF	T RATIO	COEFF	T RATIO
INTERCEPT	8.30	187.04*	4.73	115.04*
BLACK	-0.06	-5.54*	0.01	0.54
CHILD	0.06	5.92*	0.06	5.47*
EDUC	0.06	21.31*	0.05	19.59*
EXP	0.06	23.51*	0.04	16.06*
EXP2	-0.001	-15.90*	-0.001	-9.87*
MARRIED	0.11	-9.34*	0.07	5.97*
SELFEMPL	0.03	1.61	0.02	0.98
WORKPTC	-0.28	-15.20*	-0.23	-13.12*
AGRIMIN	0.15	6.81*	0.19	9.02*
ENTREC	0.46	0.57	0.05	0.64
FINANCE	0.21	6.50*	0.25	8.24*
MANUFAC	0.30	13.33*	0.26	12.56*
PERSERV	0.04	0.73	0.0	1.41
PROSERV	0.07	2.57**	0.09	3.515*
PUBADM	0.32	14.59*	0.28	14.06*
REPSERV	0.04	1.57	0.02	0.77
TRANSP	0.46	19.47*	0.41	18.99*
WSALE	0.19	5.72*	0.15	4.70*
ADMIN	-0.10	-3.63*	-0.11	-4.59*
CRAFT	-0.04	-1.86**	-0.02	-1.08
MANAGER	0.01	0.60	0.01	0.26
MINEFM	-0.27	-5.82*	-0.24	-5.57*
OPLABOR	-0.22	-7.97*	-0.19	-7.45*
OPMACHIN	-0.10	-4.28*	-0.11	-4.98*
OPMOVG	-0.19	-6.97*	-0.13	-5.00*
PROFESS	-0.03	1.92***	0.01	0.65
SERVICE	-0.13	-5.65*	-0.11	-5.12*
XFRSIM	0.06	5.43*	AFXFR 0.10	6.31*
			MCXFR 0.20	5.25*
			NAVYXFR 0.13	8.43*
	N = 17,401		N = 15,589	
	F STATISTIC 188.060		F STATISTIC 124.24	
	R-SQUARE 0.233		R-SQUARE 0.19	
	ADJ R-SQUARE 0.231		ADJ R-SQUARE 0.19	

* Significant at the 0.01 Level
** Significant at the 0.05 Level
*** Significant at the 0.10 Level

Here the difference is five percentage points with the larger negative coefficient in the weekly sample.

V. CONCLUSIONS

On the average, veteran status appears to have a slightly negative impact on the post-service earnings of military personnel. But this overall measure does not reflect some differences that exist in the returns for veterans among the services. Looking at each service separately, being a veteran has positive returns for the Air Force, Marine Corps and Navy, while the results for Army veterans were negative. The Marine Corps showed the largest overall positive return. The positive returns for the Navy and Air Force are similar to those reported in earlier studies using human capital models.

Bryant and Wilhite (1990) studied each branch of service individually and found that the four services had markedly different effects on civilian earnings. Active duty experience in the Army and Marine Corps was found to reduce post-service earnings. Military training did not mitigate this negative effect for the Army and Marine Corps. However formal military training had a positive effect for Navy and Air Force veterans.

Each service has its own distinct mission, and maintains a mix of personnel accordingly. The Navy and Air Force place a higher proportion of people in technical specialties while the Army and Marine Corps emphasize combat oriented

specialties. Since the military technical specialties generally have counterparts in the civilian job markets, military training is expected to readily transfer to civilian occupations and increase earnings potential. In contrast to this, training for combat skills is specific to each service. The expected result would be that veterans with specific training will have lower civilian returns to military service than those who received general training. The results presented in this thesis support these expectations. The Air Force and Navy had positive and statistically significant returns to both military on-the-job training and formal schooling of approximately ten percent. The Marine Corps had a small positive return while the Army had a negative return.

A large overall premium of 14 percent was found for Marine Corps veterans. There is no ready explanation for this result. The Army and Marine Corps have similar missions and emphasize similar occupational specialties, yet each had distinctly different returns to military on-the-job training and military formal schooling. It is possible that a study using longitudinal data may provide more insight into the differences between these two services.

Two different samples were used, one using annual income information and one on weekly earnings. The weekly earnings variable was used in addition to the annual earnings variable as an attempt to capture a value closer to a rate of pay per unit of time. Weekly earnings included only wages from the

respondents main civilian job whereas annual income included all income received for one year. The results for both samples were very similar although the earnings variables were defined differently.

APPENDIX A

RESEARCH STUDIES

Title: Why Do World War II Veterans Earn More than Nonveterans?

Author/ Source Angrist, Joshua and Krueger, Alan B.
Working Paper No. 2991, National Bureau of Economic Research, Inc., Cambridge, MA, May 1989

Purpose: This study tests the view that the observed World War II premium reflects the fact that men with higher earnings potential were more likely to have been selected into the Armed Forces.

Data:

Source: 1960, 1970, 1980 Censuses along with two other micro data sets,the CPS-SSA exact match and the SIPP.

Sample: Sample 1: Male citizens in 1980 who were born between 1919 and 1929, whose weekly wage in 1979 was between $25.00 and $5,000.00. N=335,989
Sample 2: Men born between 1925 and 1928, N=131354

Analysis:

1. Definition of WWII veteran: men who served in the military between September 1940 and July 1947. Correlation between birthday and veteran status. Can use this because birthday is not also correlated with other determinants of earnings.
2. Control variables: quarter during which birthday falls, region of birth/quarter of birth/year of birth interactions, and current region.
3. Estimated a variety of econometric models. Given the non-random selection process (draft) it us unlikely that OLS estimators would be unbiased estimators of the veteran premium, therefore, controlled for selectivity bisd by constructing instrumental variable estimates of the veteran premium using one's quarter of birth as an excluded instrument.

Conclusions:

1. Veterans of WWII earn six to twelve percent less than comparable veterans. (p.3)
2. WWII military service does not have a positive effect on civilian earnings.

Title: Lifetime Earnings and the Vietnam Era Draft Lottery: Evidence from Social Security Administration

Author/ Source: Angrist, Joshua D.
American Economic Review, 80:3:313-336, June 1990

Purpose: To measure the long-term labor market consequences of military service during the Vietnam era.

Data:

Source: Social Security Administrative Continuous Work History Sample (CWHS) and Mare-Winship March CPS Uniform files

Sample: Men who turned 19 in the year they were at risk of induction; includes men born between 1950 and 1953. Samples for the years 1950 through 1953 were created. Sample sizes ranged from 351 to 17,749.

Analysis:

1. Estimated effect of draft eligibility on earnings.
2. Converted the estimated effect of draft eligibility on earnings into estimates of the effect of military service.
3. Tests the hypothesis that veterans earn less than non-veterans because of loss of civilian labor market experience.

Conclusions:

1. As much as ten years after their discharge from service, white veterans who served at the close of the Vietnam era earned substantially less than non-veterans. Estimates regarding non-white veterans were not statistically significant.
2. Earnings differential associated with serving in the military during the Vietnam era appears to be accounted for by the fact that veterans have less civilian job experience.(Angrist & Kruger, working paper, p2)
3. Proposes an explanation for the loss of earnings to white veterans: they earn less because their military experience is only a partial substitute for the civilian labor experience lost while in the armed forces. Experience to earnings profiles estimated imply that white veterans suffered earnings reductions equivalent to the loss of two years of civilian labor market experience.

Title: The Civilian Earnings Experience of Vietnam-Era Veterans

Author/ Source: Berger, Mark C. and Hirsch, Barry T. The Journal of Human Resources, 18:455-479, April 1983

Purpose: To analyze the effect of military service on subsequent civilian earnings of Vietnam-era veterans. Traces earnings experiences of veterans and non-veterans who were bern between the years 1942 and 1952 from 1969 through 1978.

Data:

Source: 1969-1978 March Current Population Surveys (CPS)

Sample: Separated into schooling groups, 33,508 with twelve years of education, 47% are veterans; 13,378 with eight to eleven years of school, 26% are veterans; 25,748 with thirteen to sixteen years of school, 37% are veterans. Excluded those with no wage or salary during the previous year, enrolled in school, part-time workers who were enrolled in school, and those with less than eight years of education since they would not meet the minimum eligibility requirements of military service. N=72,632

Analysis:

1. The model permits the effects of veteran status to vary by birth cohort, age and sample year.
2. Control Variables expected to influence earnings include three regional dummy variables for the four Census regions, presence in a metropolitan area, marital status, race, unemployment rate in survey year and six broad Census industry groupings.
3. Estimated weekly earnings differentials for veterans and non-veterans by schooling group.

Conclusions:

1. Small overall differences between earnings of Vietnam era veterans and similar non-veterans during the 1968-1977 period.
2. Earnings profiles initially were lower but were steeper than non-veterans. Veterans' relative earnings improved toward the end of the period. Younger birth cohorts may have fared more poorly than older cohorts.
3. There is no evidence that military service benefited cohorts of non-whites. The lifetime earnings differentials between veterans and non-veterans are likely to be small.

Title: Military Experience and Training Effects on Civilian Wages

Author/ Source: Bryant, Richard and Wilhite, Al
Applied Economics, 22:69-81, 1990

Purpose: To separate military training from military experience by accounting for length of time spent in the military and differentiating between that time and military training.

Also explores the possibility that military experience and military training effects differ among the branches of service.

Data:

Source: National Longitudinal Survey (NLS), Youth Cohort Note: The youth cohort is represented by a national probability sample of 12,686 women and men between the ages of 14 and 21 in 1979.

Sample: Must have been interviewed in 1985, be a full time worker in 1985, be between 21 and 30 years of age. On the average, the sample consists of individuals with a slightly higher than High School educations. N=5,631: 65% white, 44% women and 6% veterans.

Analysis:

1. Longitudinal analysis: 1979 through 1985.
2. Control Variables:
   Social: Human capital variables, job tenure, education and their square.
   Economic: Local unemployment rate, geographic region, occupation and industry.
   Demographic: Age, sex, race, marital status.
   Military experience: Length of service
   Military Training: Number of months

Conclusions:

1. The time spent in the military seems to reduce wages earned during the early years of civilian worklife. The veteran "starts behind" his civilian counterpart. The longer the veteran served the greater this differential becomes.
2. Military training exerts a positive influence on civilian wage, and if enough training is obtained and individual could come out ahead.
3. The branch of service matters. The time spent in the Army and Marines reduces an individuals earning power and training received does not offset that negative impact. The Navy has an overall negative impact on earnings capability can offset the difference. Time spent in the Air Force does not reduce wages and training can increase civilian wages.

Title: Military Service and Military Vocational Training Effects on Post-Service Earnings

Author/ Source: Bolin, Phil W.
Masters Thesis, Naval Postgraduate School, Monterey, CA, June 1980

Purpose: To analyze the influence of military vocational training on post-service earnings.

Data:

Source: National Longitudinal Survey (NLS) of young men aged 14 - 24 years of age in 1966 for the survey years 1969 and 1971.

Sample: Veterans and non-veterans, individuals not in the labor force during the years of the survey were excluded. N=2,264: 552 veterans,1,712 non-veterans

Analysis:

1. Individuals were classified by their propensity to use training. Six vocational training groups were defined - veterans who received training in the military, in the civilian sector or had received none at all. Three similar groups were defined for the non-veteran component of the sample.
2. The sample was disaggregated for comparison by IQ, personal characteristics (marital status, race and age), education and civilian training.
3. Regression analysis was used with the dependent variable as annual wages.
4. Control variables - Age, race (white or non-white), IQ, marital status, region of residence (south or otherwise), time in the labor force, and military training.

Conclusions:

1. Vocational training received in the military is beneficial.
2. Among individuals classified by their propensity to use training, neither military training nor service were significant in estimating earnings after separation.
3. Disaggregation of the sample by IQ suggested that military service may be a proxy for ability level rather than a positive determinant of post-service earnings.
4. Veterans receiving no military training had lower earnings than their civilian cohorts due to a loss in foregone civilian labor market experience.

Title: Civilian Earnings of Vietnam Veterans

Author/ Source: Chamarette, S. and Thomas, G.
Unpublished paper, Naval Postgraduate School, Monterey, CA, January 1982

Purpose: To determine the relationship between military service and post-service earnings for Vietnam Veterans.

Data:

Source: 1976 National Longitudinal Survey (NLS) of young men who were aged 14 to 24 years in April 1966.

Sample: Veterans who have served a minimum of two years and non-veterans. Sample size was not given.

Analysis:

1. Compares earnings factors of veterans and non-veterans using a semi-log regression analysis.
2. Examines earnings differences and the effect of military training.
3. Control Variables - health, age, intelligence, socio-economic home environment, marital status, education, vocational training, labor market size, marital status, highest grade of schooling, vocational training, geographic region (south or otherwise), hourly pay rate, total wages and salaries earned, length of service with current employment, weeks of employment and hours worked per week.

Conclusions:

1. Black veterans have earnings factor advantages over black non-veterans. The reverse is true for white veterans.
2. Veteran status has no impact on earnings by itself.
3. Military training does not produce significant returns to veterans, nor did it offset losses from reduced labor market experience.

Title: Labor Force Status of Vietnam-era Veterans

Author/ Source: Cohany, Sharon R.
Monthly Labor Review, 110:11-17, February 1987

Purpose: To investigate the labor market difficulties of Vietnam-era veterans, especially those with service-related disabilities.

Data:

Source: Current Population Survey (CPS), April 1985 supplement in which men 18 years and older were asked about their service in the military and whether they had a service-related injury.

Sample: Veterans who served in the Armed Forces from August 1964 to April 1975 and who are currently in the non-institutional population and non-veterans.
N=62,367: 7,932 Vietnam-era veterans and 54,435 non-veterans

Analysis:

1. The CPS data was used to determine labor market performance of the veterans in terms of labor force participation, education, occupational choice, unemployment and employment status, race and disability.
2. The Vietnam-era veterans were segmented into two sub-categories, Vietnam theater and other Vietnam era (those serving in areas other than the Vietnam theater).

Conclusions:

1. Labor force. Vietnam veterans were as likely as their non-veteran peers to be in the labor force, whether as an employee or self-employed. There was no difference in probability of being in the labor force of veterans of all races. This was in contrast with non-veterans where blacks have lower participation rates than white non-veterans. Labor rate participation for disabled varied widely depending on the severity of the injury.
2. Unemployment. Vietnam-theater veterans had a greater unemployment rate than Vietnam-era veterans. The jobless rate for disabled veterans was much higher than others. The jobless rate for black veterans was substantially higher than either whites or hispanics.
3. Employment. Vietnam veterans account for more than one out of four men in the labor force between the ages of 30 and 44. Government and public sector employers had incentives in place for hiring veterans.
4. Education and Occupations. The role of education in choice of occupation appeared critical for veterans. An estimated seventy percent of Vietnam-era veterans attended school after separation yet veterans are less likely to hold college and postgraduate degrees than their non-veteran peers. Some military occupations did not have direct transferability to

civilian occupations making the transition into the civilian workplace more difficult for the veteran. Veterans who served in the Vietnam theater were more likely than others of the same era to hold skilled craft and protective service jobs rather than managerial and professional positions. Disabled veterans were more likely to be professionals, clerical and unskilled laborers. Black veterans paralleled white veterans but they were more likely to hold lower level white-collar positions than non-veteran blacks.

Title: The Economic Returns to Military Service

Author/ Source: Daymont, Thomas and Andrisani, Paul J.
Center for Labor and Human Resource Studies School of Business and Management, Temple University, Philadelphia, PA, December 1986

Purpose: To assess the extent to which service in the military is a good career investment for young men.

Data:

Source: National Longitudinal Surveys of Labor Market Experience (NLS)

Sample: Two cohorts:
1. NLS-Youth, men aged 22-26 years in 1984, N=4000
2. NLS-boys, men aged 29-39 in 1981, N=5000

Analysis:
1. The sample was partitioned into three groups: military, college and civilian work. These groups were based on the major activities chosen by young men during the first few years after high school.
2. Created poled cross-sectional time series data file for years 1978-1983 using the NLS-boys data.
3. Control Variables - categories of variables used include:
   Life cycle - discharge date, if completed a tour of service, time since left the military, college graduate, years since college, high school graduate, years since high school, used educational benefits.
   Human Capital - education thorugh high school, mental ability, locus of control, health limitations
   Background - presence of an adult male, amount of literature in the home.
4. Used OLS models:
   Cohort 1: estimated earnings profiles based on me since high school.
   Cohort 2: compared choices concerning college by the age 24. Options included are Military service with no college, military service then college, no military service and no college or civilian job then college.

Conclusions: Short Term
1. The authors found a substantial drop in earnings for veterans after leaving the service.
2. Veterans have higher earnings growth ad they overtake non-veterans within two to three years.

Long Term

1. There is a significant earnings advantage for young men while in the service compared to their civilian counterparts.
2. The earnings of veterans drop substantially upon leaving the service.
3. Civilian earnings of veterans rise rapicly after separation and overtake the earnings of their civilian counterparts within one to four years.
4. Once veterans' earnings match those of civilians who have never served, the higher earnings persist for the veterans until the end of the period of the study, approximately nineteen years after completion of highschool.
5. Veterans who complete a tour of duty prior to obtaining a college education earn more than those who work in the civilian labor market and then obtain a college education; but they earn somewhat less than men who obtain their college education soon after high school.
6. Only small differences exist among those who worked in combat arms, technical and other types of military jobs in terms of subsequent civilian earnings.

Title: Veteran Status and Civilian Earnings

Author/ Source: De Tray, Dennis N.
Rand Corporation, Rand Report R-1929-ARPA, prepared for Defense Advanced Research Projects Agency, March 1980

Abstract: This report analyzes the causes of the higher average market wages for veterans as compared to non-veterans and assesses the fraction of that premium due directly to military service and the fraction related to factors that are correlated with, but not directly caused by, military service.

Data:

Source: National Longitudinal Survey (NLS) of Young Men aged 14-24 in 1966.

Sample: Part 1: Used the 1971 panel of the NLS, N=3,946
Part 2: 1960 and 1970 Census Public Use Samples, sample size not given.

Analysis:

Part 1:
1. estimated returns to veteran status for the 1971 panel using income observations in 1971 and 1975.
2. Control Variables: Age (in 1971 or 1975), years of actual work experience since 1965, years of actual work with current employer, vocational training, veteran status, disability, and region of residence.

Part 2:
1. Stratified the sample into eleven four year age groups and used a log linear equation to test the effect of veteran status on civilian earnings based on three hypotheses:
   a. It is a positive function of the proportion of men in a given population who claim veteran status.
   b. Veteran status is a more useful screen for blacks than for whites because the quality of schooling varies more for blacks than for whites.
   c. The premium to veteran status will lessen as schooling levels increase.

Conclusions:
1. Veterans receive higher market wages, on average, than do men who have never served in the military.
2. Veteran status is a useful screening device, especially for blacks and for those with less education.

Title: Veteran Status as a Screening Device

Author/ Source: De Tray, Dennis N.
The American Economic Review, 72:1:133-142, March 1980

Purpose: To test the proposition that civilian employers use veteran status as a productivity screen.

Data:

Source: 1960 and 1970 1-in-100 Census Public Use Samples

Sample: Consisted of all black and a comparable number of white civilian men between the ages of 22 and 65 for whom an hourly wage can be calculated. The self-employed were excluded.

Analysis: Tested four hypotheses using regression analysis.

1. Other things equal, the effects of veteran status on civilian earnings will be a positive function of the proportion of men in a given population who claim veteran status.
2. Because the quality of schooling varies more for blacks than for whites, veteran status will be a more useful screen for blacks than for whites.
3. Other things equal, the premium to veteran status will diminish as schooling levels rise.
4. Because the quality of schooling varies more for blacks than for whites, veteran status will be a more useful screen for blacks than for whites.

Conclusion: Some of the correlation between veteran status and civilian wages appears to be due to other factors (ex. human capital investment strategies), military service does provide civilian employers with valuable information on worker productivity.

Title: Long-Term Returns to Vocational Training: Evidence from Military Sources

Author/ Source: Fredland, John E. and Little, Roger D.
The Journal of Human Resources, 1:49-66, 1980

Purpose: To study the long-term effects of military vocational training on civilian earnings potential.

Data:

Source: National Longitudinal Survey (NLS) of older males

Sample: White males, ages 45 to 59 in 1966. Sample size not stated. Excerpt from a sample of 5,020 of which 721 had vocational training in the military.

Analysis:

1. A semilog functional form was used throughout the analysis. The earnings equations used attempted to explain the cross-sectional differences in income of 45 - 49 year old white males in 1966.
2. Control Variables:
   Human Capital - general-training variable and the highest grade of school completed (0-18)
   Specific Training - Years of tenure on current or last job, or years of tenure on longest job if the longest job was in the same occupation classification as the current job.
   Dummy for Region - dummy variable for residence in the South Census region where wage scales are generally lower
   Dummy for blue-collar occupations
   Proxy for family background - the Duncan Socioeconomic Index of the survey respondent's father (or household head(when the respondent was 15 years old.[1]
   Note: The individuals in the sample took training 15 - 20 years prior to the date their income level was selected.

Conclusions:

1. Those who use military vocational training in subsequent civilian occupations do receive long-term earnings premiums.
2. Those who do not select jobs where their vocational training can be used do not show a long-term premium.
3. Users of civilian vocational training also appear to earn premiums, while non-users do not. The results for civilian training are stronger than those for military training.

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[1] The Duncan Index is an age-adjusted weighted index of income and education levels for each occupation; and has the advantage of being simple, standardized by stage in the life cycle, and available for most of the observations in the sample.

Title: Veteran Status, Earnings and Race

Author: Little, Roger D. and Fredland, J. Eric
Armed Forces and Society, 5:2:244-259, February 1979

Purpose: To report on the long-term impact of military service on veterans, and to specifically consider the impact on individuals as a result of their race.

Data: Source: The National Longitudinal Survey (NLS) of men

Sample: Men aged 45 - 59 in 1966. N=5,020

Analysis:
1. Cross-sectional study.
2. The samples of veterans and non-veterans were segmented by race.
3. Control Variables - educational level, region of residence, age and length of time at their job.
4. Separate statistical analysis was performed for whites, blacks and non-whites. Multiple regression analysis was used with linear and semi-log forms of equations.
(**note: predominately WWII and Korean era vets**)

Conclusions:
1. Military service exerted a positive influence on the 1966 earnings of all three groups examined.
2. Veteran premium on earnings amounted to approximate 5 - 10%.

Title: Civilian Returns to Military Service: A Survey from a Human Capital Perspective

Author/ Source: Greenwood, Michael J. and Siegel, Barry
University of Colorado and Navy Personnel Research and Development Center, unpublished paper, 1987

Purpose: This paper reviews recent empirical studies on the earnings and labor market experiences of veterans in the general context of the human capital model. Differences in results possibly due to differences in data sources, variable definitions, model formulations, estimation techniques, and time periods, are all discussed. Also considered are studies that compare the earnings of retired veterans and separatees.

Analysis:

1. The authors defined the concept of human capital and provided a discussion of human capital investments and earnings functions and the role earnings functions play in estimating the returns to inhuman capital investments.
2. Labor market experiences and civilian earnings of veterans to non-veterans were compared considering the transferability of military training, the effects of the G. I. Bill, the benefit of military service to minorities, the draft and Vietnam War, and the use of military service as a "screen" by civilian employers.
3. The authors defined selectivity bias and addressed its applicability to the research reviewed.

Conclusions:

1. Evidence regarding the effect of military participation on civilian earnings is mixed, with some researchers finding a positive effect while others find no effect or a negative effect.
2. Comparisons among studies of this type are difficult because of differences in selection of data, variable definitions, time periods studied, model formulation and estimation technique.
3. Consistent threads throughout the studies support five general conclusions with respect to the earnings of veterans to non-veterans:
   a. Veterans employed in occupations related to their military specialties earn more than veterans who are not.
   b. Veterans who sue the G. I. Bill to continue their education improved their earnings in comparison to those who did not.
   c. Vietnam veterans initially fared worse than their non-veteran counterparts but their wage rates did improve and their earnings increased throughout the seventies.
   d. The bridging hypothesis was supported in that evidence was reported indicating that the military may act as a bridge to increasing socio-economic levels through improved civilian labor market opportunities.

e. Support for the "screening" hypothesis as an alternative explanation for differences in earnings between veterans and non-veterans versus the human capital theory.

Title: Military Experience, Civilian Experience, and the Earnings of Veterans

Author/ Source: Goldberg, Matthew S. and Warner, John T. The Journal of Human Resources, 22:62-81, February 1986

Purpose: This paper examines the effects of military experience and civilian experience on the earnings of veterans focusing on determining the substitutability of these two forms of experience for personnel receiving different types of military training.

Data:

Source: Social Security earnings records of individuals who separated from military service in fiscal year 1971 were obtained for the period 1972 to 1977.

Sample: The veterans selected were a cohort of individuals who left military service in fiscal year 1971. All military services are included and the entire spectrum of possible career lengths. The non-veterans earnings were reported on for the six calendar years 1972-77. Full-time students and unemployed individuals were excluded. N=3,970

Analysis:

1. Grouped all FY1971 separatees into cells based upon branch of service and Department of Defense occupational group two-digit code and length of military service (LOS) at the time of separation.
2. Then categorized the groups into eight LOS intervals.
3. The methodology included logarithmic regression analysis.
4. Control variables - race (percent white), education, retirement annuity, and branch of service.

Conclusions:

1. More military experience does increase subsequent civilian earnings but that the relative impact of military and civilian experience varies considerably by military occupation category.
2. White veterans earn more than non-whites.
3. Veterans trained in white collar occupations have higher earnings growth than those trained in blue collar occupations.

Title: From School to Work Via Military Service: An Improved Transition

Author/ Source: Hess, Mark W.
Masters Thesis, Naval Postgraduate School, Monterey, CA, June 1980

Purpose: To test the benefits of military service at civilian job entry for Vietnam-era veterans using the screening hypothesis and the 'dual' labor market theory.

Data:

Source: National Longitudinal Survey (NLS) of young men age 14 - 24 in 1966.

Sample: Veterans and non-veterans, veterans with a minimum of six months of service were included and most had completed a single term of service. Sample size not given.

Analysis:

1. Veterans an non-veterans of the same race were compared in each NLS year from 1966 to 1973 on eleven different variables using discriminant analysis. Variables were selected from the results of discriminant analyses, and studied longitudinally over the NLS years.
2. Job entry occupation and industrial sector was examined using contingency tables.
3. Control Variables - age, highest school grade completed, family socioeconomic status, inteligence, hoursly rate of pay, civilian occupational training, region of residence, urban versus rural residence, father's occupation, marital status, occupation, industry of current job, measure of individual's orientation of control, eg. the amount of control that he feels he has over events in his life.

Conclusions:

1. Veterans received significant and systematic payrate advantages over better educated non-veterans.
2. Veteran advantages were less obvious during the recession and recovery period of 1970-73. Indirect benefits of military service to the labor market may be evident in productivity, experience and maturity of veterans.

Title: Specification of Veteran Status in Estimating Post-Service Civilian Earnings

Author/ Source: Higgins, Roger J.
Masters Thesis, Naval Postgraduate School, Monterey, CA, June 1974

Purpose: This thesis analyzes the earnings of veterans and nonveterans by race over a fourteen year period from 1966 to 1980 and also develops criteria for a single term of enlistment by length of service in a particular branch of the armed forces. Based on the findings of the research, a working definition of full employment was developed.

Data:

Source: National Longitudinal Survey for Young Men (aged 14 to 24 in 1966).

Sample: Men (veterans and non-veterans)18 years or older who had worked full-time (minimum of 38 weeks) in any given year. N=21,268

Analysis:

1. The estimates of earnings equations for the fully employed subset of people are compared to the entire sample of National Longitudinal Survey of Young Men.
2. A log-linear regression model was used.
3. Control Variables used include work experience, race, veteran status, socioeconomic status, civilian vocational training received, job status, father's job status, region ov residence (south vs north), urban vs rural residence, number of years eof education completed, union membership, economic activity, availablility of jobs and a measure of the individual's orientation of control, eg. the amount of control that he feels he has over events in his life.
4. The analysis was conducted in three phases, first using a pooled sample for each of the elven yuears in which the survey was conducted, then disaggregating the data set by race and later by veteran status and last disaggregating by race and veteran status at the same time.

Conclusion: Bonafide first term enlistees tend to have different returns to their veteran status than veterans as a whole and multi-term veterans in particular, and that these returns, on average, tend to be positive.

Title: Post Service Earnings Growth Rates of Military Veterans in the Era of the All-Volunteer Force

Author/ Source: Hirschkowitz, Martin R.
Masters Thesis, Naval Postgraduate School, Monterey, CA, June 1988

Purpose: This thesis analyzes the effect of military training, veteran status, and military experience on the post-service earnings growth rates of veterans.

Data:

Source: 1971 and 1981 segments of the National Longitudinal Survey of Young Men, aged 14 - 24 in 1966.

Sample: Respondents to the 1971 and 1981 surveys. N=1,561

Analysis:

1. Two similar wage growth rate models were estimated using a semi-logarithmic form: The first used veteran status as an explanatory variable, and the second equation substituted changes in military experience for veteran status.
2. The earnings growth rate of veterans and non-veterans were compared to determine whether economic gains for veterans were a result of military service and training.
3. The economic returns of black veterans were compared to whites and blacks veterans were also compared to black non-veterans.
4. Control Variables include highest grade in school in 1966, initial amount of schooling over period of study, age, race, length of service, marital status, union membership, years unemployed and change in usual number of hours worked between 1966 and 1969.

Conclusions:

1. Veterans were found to have higher earnings growth rates compared with their non-veteran cohorts.
2. Results of the effects on earnings growth rates from both increases in military experience and general types of transferable military training were insignificant and thus were inconclusive.
3. Blacks suffered economic disadvantages, as their earnings growth rates were less than their non black cohorts. Analysis of a segmented sample consisting only of blacks indicated that black veterans no longer receive significant economic advantages over black non-veterans. The earnings growth differences between black veterans and black non-veterans were not significant.

Title: Long-Run Effects of Military Service during the Vietnam War

Author/ Source: Jackson, John L.
The Changing Labor Market, Stephen M. Hill (Ed.), Lexington Books, 1986

Purpose: To determine what effect the Vietnam War had on the labor market performance of young men age 14 to 19 in 1966.

Data:

Source: National Longitudinal Surveys (NLS) of Labor Market Experience of Young Men.

Sample: Sample consisted of:
a. Only those individuals who were interviewed in 1981.
b. Persons 14 to 19 years old in the 1966 interview.
c. Approximately one third of the sample had served in the military.
N=2,289 observations: 560 blacks and 1,729 whites

Analysis:
1. Three performance measures are used.
   a. The 1976 wage rate was used to gauge short-run performance because it reflects relative earnings before a large amount of firm-specific human capital is accumulated.
   b. The 1981 age rate is used as a long-run measure. This allows for wage changes so that any spurious short-run influences can be accounted for.
   c. The percentage of time employed between the start of the first civilian or military job after high school and the 1981 interview date is another long-run measure.
2. The sample is segmented into two categories, veterans and civilians.

Conclusions:
1. Overall, service in the military during Vietnam War had little impact on the long-run labor market earnings of this age group of young men.
2. Military service significantly increased the wages of white veterans but black veterans show no significant difference from civilians.
3. Veterans receive preferential treatment when entering the civilian labor market.
4. Particularly among whites, military service helps the performance of individuals classified as low-ability and hurts those of high ability in the long run.
5. Veterans have a higher percentage of time employed than their civilian counterparts.

Title: The Effect of Military Experience on Postservice Earnings Without the Draft

Author/ Source: Knapp, Charles B.
Rand Corporation, R-2396-ARPA, pp. 336-360, December 1978

Purpose: To determine the impact of military experience on post-service earnings in the absence of a draft. The emphasis is on assessing the sensitivity of the empirical results to military and civilian training opportunities.

Data:

Source: 1964 cross-section survey of 3,045 veterans and 6,548 non-veterans conducted for the Assistant Secretary of Defense for Manpower.[2]

Sample: Veterans and non-veterans aged 18 to 32.
N=6,964: 1,749 enlistees and 5,215 non-veterans.

Analysis:

1. A human capital model of military service is employed which lets the earnings that an individual expects to receive in a year of his civilian working life be a function of his education and military experience up to this year, and a set of personal characteristics.
2. Control Variables - veteran status, race (white or otherwise), region of residence (rural or otherwise), marital status, and military-education experience.
3. The author acknowledges the possibility of cohort bias (given generalizing future earnings characteristics from cross-sectional data) in the estimates of experience-earnings profiles of both enlistees and non-veterans. No correction is applied since the main focus of the study is in the difference in earnings rather than absolute earnings level. The author contends that the biases introduced are less important in this case.

Conclusions:

1. Enlistment is a statistically significant determinant of earnings.
2. The change in the net present value of future earnings attributable to enlistment is positive for veterans without college but negative for those with college degrees. The profitability of military service as a human investment declines uniformly as education increases.

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[2] A more complete description of the data can be found in "Military Service in American Life Since World War II: An Overview,", No. 117, National Opinion Research Center, Chicago, 1966 written by A. Klassen.

Title: Annual and Lifetime Income in Relation to Education: 1939-1959

Author/ Source: Miller, Herman P.
American Economic Review, 50:219-243, February 1979

Purpose: To examine the relationship between income and education, and specifically determine if the increase in the number and proportion of high school and college graduates from 1939 to 1958 has been associated with a reduction in income differentials.

Sample: The data for the years used in this study were derived from Census Bureau data as follows:

a. U. S. Census of Population reports
b. Bureau of the Census, Current Population Surveys,
c. Consumer income supplements to the Current Population Surveys.
d. Current Population Reports
e. Bureau of Census, "Historical Statistics of the United States-Colonial Times to 1957", July 1960

Analysis:

1. The author examines this issue from three perspectives for the period 1939 - 1958; annual income in relation to education, annual income in relation to age and education and lifetime Income in relation to education. In each of these categories, he discusses trends evident from the data and compares his findings to previous results of other research.
2. Women were excluded from the survey because it was concluded that they were predominately in the work force on a part-time basis only and the study is focusing on full-time employment.

Conclusions:

1. Workers whose education was not beyond the eight grade had smaller relative income gains than high school graduates.
2. The proportion of men employed in professional and managerial work increased significantly which suggests that industry has absorbed the increase in number of college graduates.
3. Conclusions based on estimates of lifetimes earnings are similar to those derived from the annual data.

Title: The Transferability of Military-Sponsored Occupational Training in the Post-Draft Era

Author/ Source: Mangum, Stephen and Ball, David
Industrial and Labor Relations Review, 42:2:230-245, January 1989

Purpose: To investigate the relationship between military provided training during the all-volunteer force era and post-service earnings.

Data:

Source: National Longitudinal Survey (NLS), Youth Sample, of men and women who were 14 - 21 years old when first interviewed in 1979. The Occupational Conversion Manual (1982) and the Military Career Guide (1985) were used to compare military occupational specialties with civilian occupations chosen by veterans.

Sample: Veterans and non-veterans not currently enrolled in school and reported last being enrolled between July 1, 1975 and December 31, 1979. Veteran is defined as anyone who served in the Armed Forces.
N=4,513: 1,178 veterans and 3,335 non-veterans.
Of the veterans, 628 (veteran group) had completed a full enlistment and separated from service by the 1984 interview date, 624 (non-completer group) had left military before completing a full enlistment and the remainder had completed a tour of duty and were still serving.

Analysis:

1. Primary and secondary occupational codes of military-provided training were determined for all the veterans along with their post-service employment history.
2. A positive skill transfer was defined as occurring when the military occupational specialty and occupation of choice matched. This definition holds even if the veteran did not remain in that occupation.
3. Logistic regression analysis was employed to estimate the effect of the training provider, occupation and other variables on the probability of skill transfer using the following:
   Control variables - AFQT score, highest grade completed, labor market experience, race (minority or otherwise), training provider (military apprenticeship, vocational/technical institutes, proprietary business colleges and correspondence courses, nursing programs, barber/beauty school, company-employer or other), and occupation of training (management/sales/clerical, professional/technical, craftsmen and operatives, service, or farm/transportation/construction/laborers).
4. OLS regression of (Ln) 1984 hourly wage rate was used

on selected characteristics of individuals in the sample using the following:
Control variables: AFQT score, highest grade completed, labor market experience, race, marital status, region of residence (south or otherwise, and rural or urban), wages set by collective bargaining, health limitations, veteran status, tenure with employer, active duty weeks and participation in post-school training.

Conclusions:

1. Transfer of military-acquired occupational skills is an important determinant of post-service earnings.
2. Significant amounts of skill transfer was evident, moreso than in previous studies.
3. Estimates suggest that the likelihood of skill transfer was noticeably higher for occupational training outside the military than for military-provided occupational training. Neither military nor civilian training programs appear to have a rate of skill transfer above fifty percent.
4. Within two years after separation from service, veterans received higher earnings than those who received training in the civilian sector.

Title: Skill Transfer and Military Occupational Training

Author/ Source: Mangum, Stephen and Ball, David
The Changing Labor Market, Stephen M. Hill (Ed.), Lexington Books, 1986

Purpose: To explore the transferability of training acquired through military service

Data:

Source: National Longitudinal Survey (NLS), Youth Cohort

Sample: Young men who:

a. At the initial interview date in 1979, reported being enrolled in school after July 1, 1975 but before December 1978.
b. Entered the military at some point from 1975 to 1978.
c. Left the military by 1983. (N=479)

Analysis:

1. Occupational specialties acquired in the military were compared to the occupations selected by each veteran and non-completer.
2. Logistic regressions were used to calculate the probability of matches within specific occupational specialties and among races.
3. Control variables include, AFQT score, highest grade completed, race, branch of service, time in service, completion status and military occupation.

Conclusions:

1. The study documents a greater amount of transfer occupational skills between the military and civilian sectors than evident in earlier research.
2. The majority of individuals who cite a desire for education as a reason for joining the military do attain these goals through the military.
3. Veterans who work in similar occupational specialties as those trained in while in the military earn more in the civilian sector than those who do not.
4. The results suggest that some military occupational specialties correspond to civilian sector occupations better than others.
5. The transferability of military training is a principal determinant of the economic value of the training.

Title: Military Skill Training: Some Evidence of Transferability

Author/ Source: Mangum, Steve and Ball, David
Armed Forces and Society, 13:3:425-441, Spring 1987

Purpose: To address the amount of skill transfer that exists between training acquired from military service and subsequent civilian employment.

Data:

Source: National Longitudinal Survey, Youth Cohort, Occupational Conversion Manual, and Military Career Guide

Sample: The sample includes those who:

a. Were not currently enrolled in formal schooling in 1979.
b. Reported their last enrollment as being between July 1975 and December 1979.
c. Military portion enrolled in the military between 1975 and 1979 and served on active duty.
d. The "never-servers" category were those who did not serve in the military and met the school enrollment criteria listed above as of 1984.
N=4,513: 1,178 with military experience as of 1984.
Of those with military experience, :
    a. 628 completed a full enlistment and left the military by 1984.
    b. 246 left the military prior to completing an enlistment term
    c. The remainder completed a tour of duty and were still on active duty as of 1984.

Analysis:

1. Determined the primary and secondary military occupational specialties for which individuals received training.
2. Skill transfer was defined as any match between military occupational specialty and postmilitary employment.
3. Regression equations modeling hourly wages in 1984 were used with four groups of variables:
    a. Educational attainment and civilian experience
    b. Personal characteristics, such as race, marital status, etc.
    c. Labor market environment, such as apprentice and company provided training.
    d. Characteristics of the training provider, occupation and whether skills acquired were transferred to employment.
4. Logistic models were employed to determine the probability of skill transfer for training and experience provided by military service, and when training and experience were obtained from a civilian source.

Conclusions:

1. There is a significant amount of skill transfer

between military provided training and civilian employment.

2. For veterans,
   a. skill transfer was highest for men in electronic equipment repair, medical/health services, administrative/functional support, electrical/mechanical repair, craftsmen in service support.
   b. skill transfer was lowest for men in combat arms, communication/intelligence, and "other technical".
   c. Results were similar for women, except that women were much lower in skill transfer for electrical/mechanical repair and craftsmen but higher in medical/health services and administrative/functional support.
3. Skill transfer for individuals who received training in the military was significantly lower than that for those trained in apprenticeship and employer provided training programs, but not significantly different from training received through sources such as vocational/technical institutes, proprietary business colleges.

Title: Variations in Veteran/Nonveteran Earnings Patterns Among World War II, Korea, and Vietnam War Cohorts

Author/ Source: Martindale, Melanie and Poston, Dudlley, Jr. Armed Forces and Society, 5:2:219-243, February 1979

Purpose: This study addresses the extent to which Black and Mexican American veterans fare better economically than comparably defined groups of nonveterans. This study considers the Vietnam, Korean, and World War II eras.

Data:

Source: Three 1/100 Public Use Samples of the 1970 Census Population

Sample:

a. Defines three color groups: black, white or brown, veterans or nonveterans. An individual is considered brown if his/her surname is Spanish.
b. Veterans are defined as men who have served in the armed forces, no distinction between enlistee and draftee.
c. Defines three war cohorts:
   World War II Veterans: September 1940 - July 1947
   Korean Veterans: June 1950 - July 1947.
   Vietnam Veterans: August 1964 - April 1970.
d. N=143,072: Men between the age of 25 and 34, employed during the week prior to April 1, 1970 and worked at least fifteen hours that week, received earnings in 1969 and worked at least fourteen weeks in 1969.
e. Control Variables:
   Educational Attainment - Highest year of school completed, in single years.
   Weeks Worked - Number of weeks worked in 1969, in five categories treated as intervals.
   Marital Status - in four categories treated as intervals.

Analysis:

1. Models individuals by age-matched groups to determine if annual earnings are influenced by the explanatory variables.
2. Models are estimated for each of the color groups in each of the war cohorts converting each of the explanatory variables into earnings holding constant the effects of the other two. Earnings are adjusted for the difference in average earnings between the veteran and nonveteran groups for education, marital status, and weeks worked.

Conclusions:

1. Earnings Advantages by War Cohort:
   a. Blacks for all three war periods show both a gross and adjusted earning advantage over nonveterans.
   b. Mexican Americans (results not interpretable)
   c. White veterans in the WWII and Korean cohorts show an earning advantage whereas Vietnam cohort does not.

2. Earnings Advantages adjusted for Educational attainment, weeks worked and marital status:
   a. Black WWII veterans convert their education, weeks worked and marital status into earnings at a rate greater than black nonveterans by 4 percent, 20 percent and 10 percent respectively. Korean black veterans have higher conversion rates in all areas. The Vietnam cohort of black veterans have higher conversion rates for education and weeks worked but black nonveterans have higher conversion rates for marital status.
   b. Mexican American WWII veterans convert their education into earnings at a rate greater than nonveterans by 50 percent. Marital status is also converted into dollars of earnings at a distinctively higher rate than nonveterans. The Korean cohort of veterans also show a conversion rate greater than nonveterans but not as much as the WWII cohort. The Vietnam Cohort results suggest that veterans convert educational attainment and weeks worked into greater earnings than nonveterans but are not able to do so for marital status.
   c. White nonveterans appear to have the advantage for all three war cohorts. Yet, white veterans show a superior ability to convert all three characteristics into earnings over Black and Mexican American veterans. This advantage is most evident in the Vietnam cohort.

Title: An Assessment of the Available Evidence on the Returns to Military Training

Author/ Source: Norrblom, Eva M.
R-1900-ARPA, The Rand Corporation, July 1976

Purpose: This report is a literature review on the benefits military vocational training provides an individual upon leaving the service.

Analysis:
1. The author reviewed thirteen studies which focus on veterans from pre-World War II to the 1966.
2. The methods and assumptions employed by the selected studies are compared and synthesized.

Conclusions: The author draws no conclusions based on results of the literature reviewed. She lists issues that remain to be evaluated which she concludes are necessary before the available evidence on this topic is sufficient to support firm conclusions. The considerations she includes are; the returns to specific types of military training, the returns to military training for veterans who persue their military-acquired skills in their post-service employment compared to those who do not, and the returns of military training as a complement to or substitute for civilian training.

Title: The Returns to Military and Civilian Training

Author/ Source: Norrblom, Eva M.
R-1900-ARPA, Rand Corporation, July 1976

Purpose: To examine the economic effects of formal military vocational training and on-the-job training acquired while working in a military specialty.

Data:

Source: Post-service Information File, FY 1971 (tape) which was constructed by merging the End-of-Service File with survey data on post-service civilian employment, occupation, and wages.

Sample: Army men who separated from the service in FY 1971 after one term of service. N=5,640

Analysis:

1. Cross-sectional analysis, regressions of the log of wages on selected variables were run.
2. Blacks were excluded from the analysis since past studies have shown significantly different results for whites and blacks and only a small sample size would be available for blacks in each occupational category.
3. Military specialties were combined into three occupational groups.
4. Control Variables. Four categories of variables were chosen:
   General - AFQT, years of schooling completed, region of employment and marital status.
   Military Training - formal vocational training in specialty
   Military Job Experience - amount of military job experience, relationship of military specialty to current occupation, length of service and amount of time spent in active duty specialty.
   Civilian Training - formal preservice vocational training, amount and type.
   Preservice Job Experience - Amount in and type of skilled job and amount in unskilled job.

Conclusions:

1. Wages do depend on the amount and type of training received in the military.
2. The amount of formal vocational training acquired in the civilian sector also has a significant effect on wages of veterans.
3. Preservice work experience in a civilian job related to the occupation chosen after leaving the service significantly increases the wages of veterans.
4. The amount of work experience in a specialty comparable to the current occupation has no significant effect on earnings potential.

Title: Changes in Life-Cycle Earnings: What Do Social Security Data Show?

Author/ Source: Rosen, Sherwin and Taubman, Paul
The Journal of Human Resources, 27:3:322-338, Summer 1982

Purpose: To examine life-cycle earnings patterns of white males over the 1951-1976 period.

Data:

Source: 1973 Current Population-Social Security Administration-Internal Revenue Service Exact Match Sample

Sample: The March 1973 Current Population Survey was matched record-for-record to Social Security earnings data for the period 1951-1976.

Analysis:

1. The author estimated least squares regressions for the Social Security Administration and Current Population Survey data. The Social Security Administration data was estimated two ways, first not including observations with some earnings information missing, and second with the entire sample. The Social Security Administration data was also estimated using the tobit model for all Social Security observations combined.
2. Control Variables
   Years of schooling
   Work experience
   Birth-cohort-year - eleven of these dummy variables were used in five year intervals from 1901 to 1958.
   Unemployment rate
   Quarters of social security coverage
   Marital status
   Region of residence - Northeast, South, West and Urban.
   War period - World War II, Korea or Vietnam

Conclusions:

1. Younger cohorts exhibit smaller marginal returns to schooling and larger marginal returns to experience, but differences between cohorts are very small.
2. There is a significant positive effect of World War II veteran status on life-cycle earnings and a negative effect for Vietnam veterans.
3. The effects of veteran status for both Korean and Vietnam war veterans decreases with education, but not for World War II veterans.

Title: Civilian Returns to Earnings from Prior Military Service

Author/ Source: Reams, Paul O., Jr.
Masters Thesis, Naval Postgraduate School, Monterey, CA, June 1983

Purpose: To analyze the relationship between military service and post-service earnings for Vietnam-era veterans.

Data:

Source: 1980 National Longitudinal Survey of young men (14 -24 years of age in 1966)

Sample: Draft-era enlisted veterans or non-veterans, veterans included those who completed one term of service (minimum of eighteen months)and had been employed full-time prior entering the military. N=2719:
2,187 non-veterans (520 blacks and 1,667 whites) and 532 veterans (97 blacks and 435 whites).

Analysis:

1. Sample broken down by race and veteran status
2. Multiple regression models were used to produce explanatory earnings equations for two groups, blacks and whites. Earnings equations for each race were determined by multiple regression analysis estimating separate equations for veterans and non-veterans.
3. Control Variables - for categories of variables were used:
   Individual traits - age, intelligence, and health
   Family characteristics - socioeconomic status, marital status, and number of dependents.
   Job Environment - hours worked per week, weeks employed per year, tenure, number of previous employers, community unemployment rate, union membership, collective bargaining, region of residence (south or non-south) and urban versus rural residence.
   Personal characteristics - highest grade of school completed, type of training received to learn skills required at current or last job in 1980 - vocational school, college or on-the-job training.

Conclusions: Military service for Vietnam-era veterans was found to be an ineffective method of investment in human capital for whites. The results for black veterans were inconclusive.

Title: The Relative Earnings of Vietnam and Korean-Era Veterans

Author/ Source: Schwartz, Saul
Industrial and Labor Relations Review, Vol 39, No. 4, July 1986

Purpose: This paper compares the earnings of Vietnam Veterans to those of Korean Veterans at similar points in their work lives - twelve to sixteen years after their discharge.

Data:

Source: 1968 and 1980 Current Population Surveys which contain income data for 1967 and 1979.

Sample: The sample contains data on veteransof the Korean and Vietnam wars and on nonveterans of the same time periods. N=12,840

Analysis:

1. Cross-sectional analysis comparing two different years.
2. Linear regression controlling for education, age, race, marital status, weeks worked, residence in a metropolitan area or suburb, and geographic region of residence.

Conclusions: In both 1967 and 1979, the unadjusted average annual earnings of veterans and non-veterans were similar. But after controlling for such factors as education, age, race, and marital status, it was shown that Vietnam veterans were worse off than their non-veteran contemporaries in that their rate of return per year of education was much lower. By contrast, Korean veterans were economically indistinguishable from non-veterans.

Title: Post-Service Earnings of Vietnam-Era Veterans

Author: Soyak, Erdinc
Masters Thesis, Naval Postgraduate School, Monterey, CA

Date: December 1987

Purpose: This thesis analyzed the effect of military service and military training on post-service earnings of Vietnam veterans.

Data:

Source: 1981 National Longitudinal Survey of Young Men (14-24 years of age in 1966)

Sample: Enlisted men working full-time (over thirty-five hours) at their current or last job. N=2,677

Analysis:

1. Data were disaggregated by race and veteran status. A chow test indicated that the data could not be pooled for blacks and non-blacks.
2. A semi-log functional model was used to estimate earnings equations.
3. Control Variables were grouped into five categories:
   Individual traits - age, health status, and race.
   Family characteristics - marital status and number of dependents
   Job environment - hours worked per week, weeks employed per year, tenure of job, collective bargaining, region, standard statistical metropolitan area, and work experience.
4. Personal characteristics - years of education
5. Military specific characteristics - Vietnam era, length of service, branch of service, age entered the military, number of months training in military, method of entry, type of training in military and Vietnam veterans with more than 17 months length of service.

Conclusions:

1. There are some significant differences between the earnings factors of veterans and nonveterans.
2. When the hourly rate of pay is used as an earnings measure with a semi-logarithmic function, the data could not be pooled for blacks and non-blacks but could be pooled for veterans and non-veterans.
3. Veteran status does not have significant returns from either military training or time spent in the service.

Title: Veteran Status and Socioeconomic Attainment

Author/ Source: Villemez, Wayne and Kasarda, John
Armed Forces and Society, 2:3:407-20, May 1976

Purpose: To determine the economic consequences of military service.

Data:

Source: U. S. Bureau of the Census 1970 public use sample.

Sample: Veterans and nonveterans from World War II, Korean War and Vietnam conflict time periods. N=54,234: men 18-64 years old, 25,708 veterans and 26,596 non-veterans.

Analysis:

1. Veterans of each war cohort were separately compared to nonveterans of the same era.
2. The sample was segmented into five age groups and the data for whites and nonwhites were analyzed separately.

Conclusions:

1. Overall, veterans appear to be economically superior to nonveterans.
2. World War II veterans received the most economic return. Korean veterans were only slightly superior to nonveterans and Vietnam veterans' returns were inferior.

APPENDIX B

VARIABLE DEFINITIONS

MILITARY CHARACTERISTICS

AFNG	1 if serves in Air Force National Guard 0 otherwise
AFRES	1 if serves in Air Force Reserve 0 otherwise
ARNG	1 if serves in Army National Guard 0 otherwise
ARRES	1 if serves in Army Reserve 0 otherwise
MCRES	1 if serves in Marine Corps Reserve 0 if otherwise
NAVRES	1 if serves in Naval Reserve 0 otherwise
AFVET	1 if previous active duty in Air Force 0 otherwise
ARMYVET	1 if previous active duty in Army 0 otherwise
MCVET	1 if previous active duty in Marine Corps 0 otherwise
NAVYVET	1 if previous active duty in Navy 0 otherwise
SERVACT	1 if served less than one year active duty 0 otherwise
SERVACTT	1 if served two or more years of active duty 0 otherwise
XFRSIM	1 if civilian job similar to guard/reserve duty 0 otherwise
AFXFR	1 if AFVET and civilian job is similar to guard/reserve duty 0 otherwise
ARMYXFR	1 if ARMYVET and civilian job is similar to guard/reserve duty 0 otherwise
MCXFR	1 if MCVET and civilian job is similar to guard/reserve duty 0 otherwise
NAVYXFR	1 if NAVYVET and civilian job is similar to guard/reserve duty 0 otherwise

INDIVIDUAL CHARACTERISTICS

AGE	Range 16 to 64 years

APPENDIX B (continued)

VARIABLE DEFINITIONS

BLACK	1 if respondent's race is black 0 otherwise
HISP	1 if hispanic 0 otherwise
LANG	1 if English main language spoken at home 0 otherwise
EDUC	years of education completed range sixth grade through 8+ years of college
HSGRAD	1 if high school graduate 0 otherwise
COLLEGE	1 if some college education 0 otherwise
MARRIED	1 if married 0 otherwise
CHILD	1 if two or more dependents 0 otherwise
EXP	AGE minus EDUC minus 6

TRAINING

MILOJT	1 if military on-the-job (OJT) training 0 otherwise
AFOJT	1 if received OJT on active duty in the Air Force 0 otherwise
ARMYOJT	1 if received OJT on active duty in the Army 0 otherwise
MCOJT	1 if received OJT on active duty in the Marine Corps 0 otherwise
NAVYOJT	1 if received OJT on active duty in the Navy 0 otherwise
RESOJT	1 if guard/reserve on-the-job training 0 otherwise
MILSCH	1 if formal military school 0 otherwise
AFSCH	1 if AFVET and attended formal military school 0 otherwise
ARMYSCH	1 if ARMYVET and attended formal military school 0 otherwise
MCSCH	1 if MCVET and attended formal military school 0 otherwise
NAVYSCH	1 if NAVYVET and attended formal military school 0 otherwise
CIVSCH	1 if formal civilian school 0 otherwise
CIVOJT	1 if civilian on-the-job training 0 otherwise

APPENDIX B (continued)

VARIABLE DEFINITIONS

CORRESP	1 if correspondence course 0 otherwise

WORK CHARACTERISTICS

WORKRES	1 if working full-time in guard/reserve 0 otherwise
WORKFTC	1 if working full-time in civilian job 0 otherwise
WORKPTC	1 if working part-time in civilian job 0 otherwise
UNEMPL	1 if unemployed 0 otherwise
SELFEMPL	1 if self employed 0 otherwise
PRIFIRM	1 works for a private corporation 0 otherwise
FAMBIZ	1 works in a family owned business 0 otherwise
FEDGOV	1 if employed by the Federal Government 0 otherwise
STATEGOV	1 if employed by a State Government 0 otherwise
LOCALGOV	1 if employed by a Local Government 0 otherwise
PRIFIRM	1 if employed by a civilian firm 0 otherwise
HOURS	1 if worked more than 40 hours per week one or more weeks during the year 0 otherwise

INCOME VARIABLES

INCANN	Respondent's annual income (restricted to greater than 0)
INCWKLY	Respondent's weekly earnings (restricted to greater than 50)

DEPENDENT VARIABLES

LNENGS	Natural logarithm of respondent's annual income
LNWKLY	Natural logarithm of respondent's weekly earnings

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